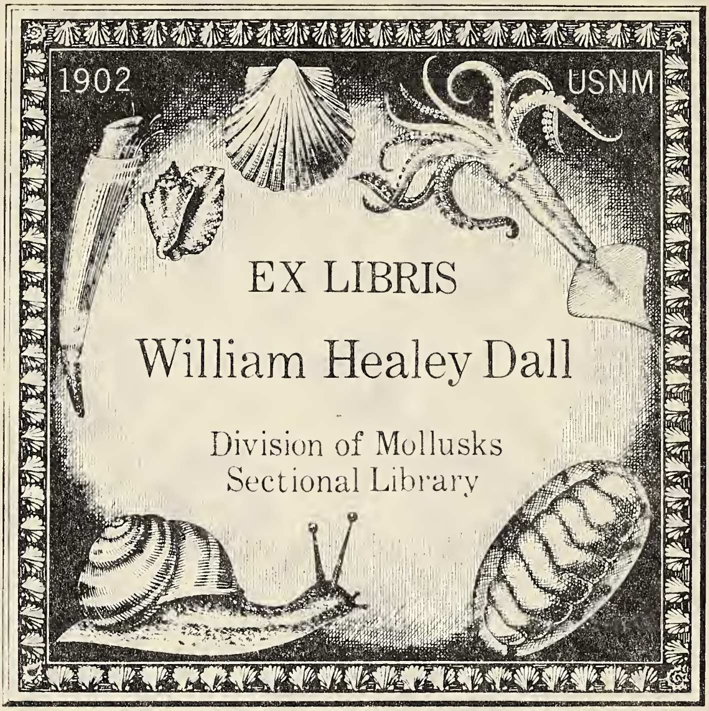

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—REPORT—

Fourth Annual Meeting

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THE AMERICAN MALACOLOGICAL UNION

FOURTH ANNUAL MEETING, STANFORD UNIVERSITY, JUNE 25-28, 1934

BUSINESS MEETING, JUNE 25, 10:00 A. M.

An invitation from the Buffalo Museum of Science that the American Malacological Union meet in Buffalo in 1935 was read. Acceptance of the invitation, which had been approved by the Council, was moved by Mr. Baily and seconded by Mr. Caruthers. It was carried unanimously.

An invitation from Captain Reed of St. Petersburg, Florida, that the 1936 meeting be held in Florida was read. It was moved by Dr. Grant to advise Captain Reed that the meeting recommends the acceptance of the invitation, final decision being reserved until the 1935 meeting. Seconded by Mrs. Chace. Carried.

The following resolution was proposed by Dr. Grant:

"Whereas, Professor Josiah Keep's *West Coast Shells* has been very valuable in interesting and aiding large numbers of amateur conchologists, and the supply is now exhausted, and

"Whereas, Mr. Joshua L. Baily, Jr., has prepared a revision of the book, bringing nomenclature down to date,

"Resolved, therefore, that the American Malacological Union, in session at Stanford University June 25-28, 1934, recommend the publication of the revision."

Adoption of the resolution was seconded by Mr. Vander Schalie, and carried.

Concerning the preparation of a manual of bivalves, the following resolution was proposed by Dr. Grant:

"Whereas, a continuation of the Manual of Conchology to include the recent bivalve mollusks of the world is very much needed, and

"Whereas, we have been informed that Dr. Henry A. Pilsbry would be willing to undertake its preparation if additional assistance could be provided,

"Resolved, that the American Malacological Union, in session at Stanford University on June 25-28, 1934, recommend and urge that the Academy of Natural Sciences of Philadelphia, if practicable, provide Dr. Pilsbry with such assistance, and publish the work at an early date."

The motion for adoption was seconded and carried.

BUSINESS MEETING, JUNE 27, 9:30 A. M.

A motion that the Secretary cast a ballot for the following council was made by Dr. U. S. Grant, IV:

Honorary President—Mrs. Ida S. Oldroyd, Stanford University.
President—William J. Clench, Harvard University.
Vice-President—Calvin Goodrich, University of Michigan.

Corresponding Secretary—N. W. Lermond, Knox Academy of Arts and Sciences, Thomaston, Maine.
Financial Secretary — Mrs. Imogene C. Robertson, Buffalo Museum of Science.
Henry A. Pilsbry, Philadelphia Academy of Natural Sciences.
Junius Henderson, University of Colorado.
Herbert N. Lowe, Long Beach, California.

The motion was seconded and carried.

These minutes were read at the final session, 2:00 P. M., June 27, and were accepted.

Respectfully submitted,
(Signed) MYRA KEEN,
Acting Secretary.

ABSTRACTS OF PAPERS READ AT THE FOURTH ANNUAL MEETING OF THE AMERICAN MALACOLOGICAL UNION, STANFORD UNIVERSITY,

JUNE 25-28, 1934

Address of Welcome: Mrs. Ida S. Oldroyd, "The History of the Stanford Collection." A list and brief descriptions of the principal acquisitions which comprise the Stanford Collection. Important component collections were from Mr. and Mrs. Oldroyd, Miss Law, Henry Hemphill, Harold Hannibal, the Rev. Taylor, Eric Jordan, Herbert N. Lowe, and Mrs. S. A. Mitchell.

Presidential Address: Junius Henderson, "Our unstable biological classification and nomenclature." A protest against wholesale changing of family, generic and specific names, declaring that many of the changes are not necessary under the rules or facts. Interpretation and application of the rules in the interests of stability and for the preservation of names in general use, rather than as a pretext for changing names was urged. The value of the priority rule, unless very wisely applied, was questioned, and the suggestion advanced that many proposed genera should be made of subgeneric rank.

"Some observations on the molluscan fauna of certain Utah lakes," Vasco M. Tanner. A discussion of the physical and chemical properties of the waters of certain lakes, the changes in such conditions due to use of water for irrigation, and the effect of such changes on molluscan life.

"Remarks on recent collections from tropical western North America," A. M. Strong and L. G. Hertlein. A general discussion of some of the important results of recent expeditions to tropical western North America. The expeditions mentioned were: the Hancock Expedition, 1931-1932, and the Templeton-Crocker Expedition, 1932, of the California Academy of Sciences, to the Galapagos Islands. Collections from many localities between San Diego, California, and Panama, made by Mr. H. N. Lowe, have likewise yielded important results.

"West American species of *Cerithidea* and *Goniobasis*," Junius Henderson. The discussion was based upon abundant material from twenty *Cerithidea* stations in California and about 200 *Goniobasis* stations in California, Oregon and Washington. One or two species of the former were recognized, with two or three varieties of slight value, and fifteen species and subspecies or varieties of the latter, several of them undescribed. Lantern slide illustrations were shown.

"Notes on egg cases of some marine gastropods," Mrs. Louise M. Perry, read by Harold Heath. Egg-capsules, embryos, and newly hatched young of over 25 gastropods were identified, described, and figured (the figures by Miss Margaret Storey). These field and laboratory notes included studies of the spawning habits of certain of the adults. Appended was a preliminary check-list of marine mollusks of Sanibel Island, Florida.

"Notes on egg cases of some West Coast marine gastropods," Miss Myra Keen. Brief descriptions of egg cases on display in the Oldroyd Collection.

"The present status of the family Amnicolidae," Elmer G. Berry. From the time of Haldeman (1845), the knowledge of the family Amnicolidae has grown to include approximately 140 species and subspecies. A few of these have never been figured. The soft parts and radulae of the majority of species are unpublished. A revision of the family is being undertaken.

"The type locality of *Helix tudiculata* var. *tularensis* Hemphill," G. Dallas Hanna. (Read by title.)

"Brief notes on observations, discoveries, and interesting experiences in collecting mollusks," by everybody. E. H. Quayle: At San Felipi during an extremely low tide (—4.5 feet) collected a sack full of gorgonias on which were 19 specimens of an *Ovula* of which, in all the previous collecting, only one specimen had been obtained. E. P. Chace: Found four specimens of *Fusus harfordi*, the only examples since the type lot, which consisted of only two or three specimens; this is apparently a deep-water form which comes in to spawn in June or July. Mrs. Oldroyd: At Nanaimo, British Columbia, *Polinices lewisii* come in to spawn during June and July in great abundance. L. G. Hertlein: A tropical *Mitra*, dredged during the Crocker Expedition, placed in a raw-sea-water aquarium in San Francisco, lived two years. J. L. Baily, Jr.: An *Oxystyla* came to life after being in a collection 24 years. M. E. Caruthers: Specimens of *Helicostyla* obtained from the Philippines lived nearly a year in a California greenhouse. Junius Henderson: Told of a successful race with a flood in Montana, to obtain fresh-water mussels. E. P. Chace: Suggested from personal observation that the probable length of time from the hatching of land snails to the acquisition of adult characters is about three years. E. H. Quayle: Ralph Arnold, looking at the types of two species of two different genera of fossils which Dall had named, found that the two pieces fitted together to make a single specimen. Junius Henderson: Specimens of *Acteocina* occurring in the Salton Sea may be reworked fossils. E. P. Chace: *Lymnaea bulimoides bulimoides* was abundant after a heavy rain in a pasture which had been dry perhaps two to three years, and was more common remote from a brook than near it. Mrs. E. M. Chase: *Lamellaria stearnsii* at Crescent City has a white shell and occurs on a white ascidian.

"Science for the average citizen," Miss Julia Ellen Rogers. A discussion of the real function of the teacher as Agassiz defined teaching, with the suggestion that present-day scientists are overlooking the necessity for propagating popular interest.

"Collecting grounds of West Mexico, Gulf of California and Central America," Herbert N. Lowe. Lantern-slide illustrations and brief descriptions of localities visited during a series of collecting expeditions.

"Hunting land shells in northwestern California," E. P. and E. M. Chace. In the *Monadenia* group, *infumata* usually aestivates under rocks and in holes. In the extreme southern portion of its range, *fidelis* climbs trees, but in West Central Oregon, it seals down on the ground. In both regions it is dominant during the winter. Most of the vari-colored colonies are near the coast.

"The uses and abuses of shells," Mrs. Ida S. Oldroyd. A display of objects in whose construction shells have been utilized.

"Transposed hinge teeth of North American Naiades," Henry Vander Schalie. Attention was called to transposed hinge-structures, particularly the lateral teeth, of many species of Naiades belonging to the Unioninae and Lampsilinae. It was recommended that such variations be recorded, since they may in time give us some clews as to the evolution of the Naiades from their marine ancestors, as well as give us a means for properly evaluating paleontological material.

"The tropical Pectinidae of western North America," L. G. Hertlein. A general discussion of the species of *Pecten* occurring between San Diego, California, and Cape Horn. Some comparisons were made with the species of eastern North America, and also remarks on the relations to some of the fossil forms in the Tertiary of western North America.

"The Opisthobranch Mollusca of the California coast," F. M. MacFarland. A review of the Opisthobranch mollusca, with special reference to the Nudibranchs of the California coast, illustrated with lantern slides and a series of beautiful paintings made by Mrs. MacFarland.

"The effect of alcohol on the growth of *Physa traskii*," Joshua L. Baily, Jr. The account of an experiment performed by raising snails *ab ovo* in the laboratory in various concentrations of alcohol. The effect of the alcohol was to stunt the growth of very young and very old snails, but to accelerate that of middle-aged snails.

"The Mollusca of Newport Bay, California," Morris E. Caruthers. A locality list of 155 species.

"Some optical principles involved in the mounting of Molluscan radulae," G. Dallas Hanna. (Read by title.)

"Notes on the introduction of exotic species of mollusks, and on natural methods of dispersal," by everybody. Mrs. Kate Stephens: The Japanese rice-shell, *Viviparus*, has been introduced into California, and is rather common at Stockton. It was apparently introduced by Orientals for food. Morris E. Caruthers: An eruption of a single colony of *Helix pisana* occurred near Los Angeles, the destruction of which required the burning-over of several acres. Elmer Berry: An *Oxystyla* collected in Utah evidently had come in on bananas. Junius Henderson: A Recent *Cerion* found on a prairie-dog mound in Colorado had evidently been dropped there by some person. Birds constitute another mode of dispersal, sometimes carrying mollusks over long distances.

"The red shell money of western Melanesia," W. J. Eyerdam. (Read by Mrs. Jean Wilkins.) A discussion of the uses of discs made from *Spondylus* shells in the Solomon Islands, red money being made from the deep red margin, white money from the white interior, the two kinds differing greatly in value.

"The boring bivalve mollusks of the west coast of America," Mrs. Ida S. Oldroyd. A brief description, illustrated with lantern slides, of the West Coast species of Pholadidae.

"A review of the genus *Carinifex* Binney," G. Dallas Hanna and Junius Henderson. A discussion of the names *Carinifex* Binney versus *Megasystropha* Lea, the present distribution, the geological history and distribution of the genus, and its relation to *Helisoma*. Six living and six fossil species and varieties were recognized, and three doubtful species listed.

"*Helminthoglypta arrosa mailliardi Pilsbry* and *H. a. expansilabris* Pilsbry," E. P. and E. M. Chace. An analytical study of nineteen colonies, representing these two subspecies, collected in northwestern California and southwestern Oregon.

"The Pteriidae, Ostreidae, Spondylidae and Anomiidae of tropical western North America," L. G. Hertlein. Recent expeditions to tropical western North America have yielded many species of Pteriidae, Ostreidae, Spondylidae, and Anomiidae. Most of the described species belonging to these families in western North America are now represented in collections on the West Coast. The range and relationship of the species which have been reported from San Diego, California, to Cape Horn were discussed.

"Exhibition of notebooks on West American Mollusks," Junius Henderson. Brief description and display of some forty notebooks.

"The littoral ark-shells of southern California," S. Stillman Berry. (Read by E. P. Chace.)

"Photographs of some common West Coast shells," Miss Myra Keen. Display of photographs.

"Southern California Acanthinas," Mrs. Mary D. Connelly. (Read by title.)

"The distribution of *Melania* and *Neritina* in the Solomon Islands," W. J. Eyerdam. (Read by title.)

"Brief notes on the effect of environment upon shells of mollusks," by everybody. Charles H. Blake: In New England, introduced snails and slugs show none of the odd color varieties which are described in other localities. Mrs. E. P. Chace: In southern California *Megatebennus bimaculatus* is gray or light yellow; in northern California it is brilliant red or lemon yellow. (Mr. Lowe suggested that this color-difference may be in part a matter of sex, and Mr. Wheeler that it may be a Mendelian variation.) Charles H. Blake: A native New England *Helix* has been supposed to be a three-to-one Mendelian variant, but this relationship holds only in the laboratory, not in nature.

"Neotypes," Don L. Frizzell and Harry E. Wheeler. A case was cited in which the original types of a species "A" are lost, and in which two or more species, all of which fit the description of species "A", occur at the type locality. The identity of species "A" can be established only by the designation of one or more neotypes. This case has been submitted to the International Commission on Zoological Nomenclature in the hope of obtaining a ruling on the validity of the term "neotype."

"Some notes on *Oreohelix strigosa* Gould," Allyn G. Smith and G. Dallas Hanna.

* * *

LIST OF MEMBERS OF THE AMERICAN MALACOLOGICAL UNION

Active Members

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Aguayo, Carlos Guillermo—Museo Poey, Universidad de la Habana, Cuba. Coll. exch. Cuban land shells for other Neotropical land shells.
Alabama Museum of Natural History—University, Ala.
Aldrich Museum—Box 155, Bay Island, Balboa, Calif. Conch. exhibit. Loans.
Allen, W. R.—Dept. of Zool., Univ. of Kentucky, Lexington, Ky.
Anderson, Malcolm C.—Bremerton, Wash. Coll.
Andrews, Mrs. James N.—Somerset, Va.
Andrews, John E.—50 Orton Place, Buffalo, N. Y.
Archer, Allan F.—Museum of Zoology, Ann Arbor, Mich.
Awl, Mrs. Aime M.—U. S. National Museum, Washington, D. C.

Babson, Mrs. Stanley M.—Ludington Road, West Orange, N. J.
Bailey, Harold H.—206 Exchange Bldg., Miami, Fla.
Bailey, John Wendell—Dept. of Biology, Univ. of Richmond, Va.
Baily, Joshua L., Jr.—4435 Ampudia Street, San Diego, Calif.
Baily, Ruth Ingersoll—4435 Ampudia Street, San Diego, Calif.
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Baker, Fred—Point Loma, Calif.
Baker, Horace Burrington—Zool. Lab., Univ. of Penna., Philadelphia, Pa.
Baker, Myrtle—369 Humboldt Parkway, Buffalo, N. Y.
Barone, Vincent—278 7th Street, Buffalo, N. Y.
Balch, Francis N.—60 State Street, Boston, Mass.
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Banks, Gilbert S.—Norfolk Street, Holliston, Mass. Coll. exch. land and f. w. shells.
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Barker, C. Austin—548 Alvarado, Campus, Palo Alto, Calif.
Bates, Byron E.—R. F. D. No. 1, Pierrepont Manor, N. Y.
Bedell, Joseph—Biological Institute, Cambridge, Mass.
Berkeley, W. N.—30 Fairview Street, Yonkers, N. Y.
Bermudez, Pedro J.—Apartado 10, Matanzas, Cuba. Exch. Cuban land shells.

Berry, Elmer G.—Museum of Zoology, Univ. of Mich., Ann Arbor, Mich.
Blake, Charles H.—Dept. of Biol., Mass Inst. of Tech., Boston, Mass.
de Boe, Mrs. Michael Price—Box 501, Coral Gables, Miami, Fla.
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Bowles, Edgar Oliver—U. S. National Museum, Washington, D. C.
Bowman, Mrs. Paul—813 Wilson Blvd., Clarendon, Va.
Brock, Clarence L.—Director-Secretary, Houston Museum of Natural History, Houston, Texas.
Brooks, Stanley T.—Carnegie Museum, Pittsburgh, Pa.
Brooks, Mrs. Stanley T.—Carnegie Museum, Pittsburgh, Pa.
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Chace, Mrs. E. M.—989 W. 5th Street, San Pedro, Calif.
Chace, Gail P.—989 W. 5th Street, San Pedro, Calif.
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Conrad, Mrs. A. H.—780 Main Street, Glen Ellyn, Ill.
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Cooke, C. Montague, Jr.—Bishop Museum, Honolulu, T. H.
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Darbaker, L. K.—Pittsburgh College of Phar., 1431 Blvd. of the Allies, Pittsburgh, Pa.
Deckert, Richard F.—553 N. W. 64th Street, Miami, Fla. Coll., exch., sell Liguus.
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Eshnaur, Mrs. W. H.—938 Flower Street, Bellflower, Calif. Coll., exch.
Eyerdam, Walter J.—9253 Corliss Avenue, Seattle, Wash.

Faulconer, Philip—1770 Fort Stockton Drive, San Diego, Calif.
Faustino, Leopoldo A.—Bureau of Science, Manila, Phil. I.
Fluck, William Henry—706 Cornelia Street, Utica, N. Y.

Fowler, Mrs. Marvin Edward—3737 Van Ness Street, N. W., Washington, D. C.
Fox, Jay T.—Seaford, L. I. Coll., exch.
Frampton, Henry—Miami Daily News, Miami, Fla.
Fraser, Charles McLean—Univ. of B. C., Vancouver, B. C.
Frizzell, Don L.—5638 12th Avenue, N. E., Seattle, Wash. Coll. W. Coast Mollusca and Pleistocene.
Frykland, L. S.—Rosseau, Minn. Coll., exch. birds' skins and eggs.

Gardner, Julia—Dept. of Mollusks, U. S. National Museum, Washington, D. C.
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Gaylord, Ilsien Nathalie—Hotel Commander, Cambridge, Mass.
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Grant, U. S. 4th—405 Hilgard Avenue, Los Angeles, Calif.
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Gregg, Wendell O.—Stanley Emergency Hospital, 117 E. Main Street, El Monte, Calif. Coll., exch. Mollusca of W. N. A.
Guitart, Raul P.—Carlos de la Torre School, Sancti Spiritus, Cuba. Land shells. Urocoptidae, Cyclostomidae and Helicidae.
Gurley, William F. E.—6151 University Avenue, Chicago, Ill.

Hall, Mrs. J. A.—Route 2, S. Paris, Maine. Coll., buy.
Hand, Edwin E.—6138 Kimbark Avenue, Chicago, Ill.
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Hanna, G. D.—Calif. Acad. of Sci., Golden Gate Park, San Francisco, Calif.
Harbison, Anne—151 W. Susquehanna Avenue, Philadelphia, Pa.
Harris, G. D.—Paleon. Lab., Cornell Univ., Ithaca, N. Y.
Harris, Wray—Yard Dispensary, Pearl Harbor, T. H.
Hart, Cecil—132 N. 3rd Street, Montebello, Calif. Coll., exch.
Henderson, Junius—Boulder, Colo.
Henderson, Mrs. Junius—Boulder, Colo.
Herrick, Stephen M.—Paleon. Lab., Cornell Univ., Ithaca, N. Y.
Hertlein, Leo G.—Calif. Acad. of Sci., San Francisco, Calif. Coll. Pelecypoda.
Hill, Howard R.—Los Angeles Museum, Los Angeles, Calif. Coll., exch.
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Humes, Arthur G.—R. F. D. 4, Attleboro, Mass.
Jackson, Ralph W.—Route 1, Cambridge, Md. Coll., exch.
Jaume, Miguel L.—Calle 6, No. 24½, Vedado, Habana, Cuba.
Johns, Louis Edgar—Skidmore College, Saratoga Springs, N. Y.
Johnson, J. M.—293 S. Pleasant Avenue, Ridgewood, N. J.
Jones, David T.—Biology Dept., Univ. of Utah, Salt Lake City, Utah.
Jones, J. W.—818 E. 15th Street, Vinton, Iowa.

Keen, Myra—Box 1563, Stanford University, Calif. Conch., Ornith., Psych.
Kincaid, Trevor—Dept. of Zool., Univ. of Wash., Seattle, Wash. Coll.
Kofoid, C. A.—Univ. of Calif., Berkeley, Calif.

Ladd, Henry S.—U. S. National Museum, Washington, D. C.

Lane, J. M.—147 S. Roosevelt Avenue, Pasadena, Calif.
LaRocque, A.—National Museum of Canada, Room 8, Ottawa, Canada, f. w. shells; Pleist.
Latchford, F. R.—Osgood Hall, Toronto 2, Ont.
Lermond, Norman W.—Knox Academy of Arts and Sciences, Thomaston, Maine. Coll., exch., buy, sell.
Lowe, Herbert N.—2209 Lowena Drive, Long Beach, Calif. Retired; devotes time to shells.

MacFarland, Frank M.—775 Santa Yuez Street, Stanford Univ., Calif.
MacNeil, F. Stearns—U. S. National Museum, Washington, D. C.
Mantle, J. G. C.—111 Ames Avenue, Leonia, N. J.
Marks, E. Sidney—655 Kearney Avenue, Arlington, N. J. Coll., exch. land and f. w. shells.
Marshall, William B.—U. S. National Museum, Washington, D. C.
McGlamery, Winnie—Ala. Museum of Nat. Hist., University, Ala.
McLean, North—Dochgarroch Farm, Shrub Oak, N. Y.
McLean, Lucille S.—Dochgarroch Farm, Shrub Oak, N. Y.
McMillin, Harvey C. — Natural History Museum, Stanford University, Calif.
McWain, Mary M.—20 Ross Street, Batavia, N. Y.
Mickey, A. B.—Univ. of Wyoming, Laramie, Wyo.
Miner, Roy W.—American Museum of Natural History, New York.
Mitchell, Sarah J.—86 M Street, S., Boston, Mass.
Morgan, Richard F.—139 W. Oakwood Place, Buffalo, N. Y.
Mozley, Allan—Johns Hopkins University, Baltimore, Md.
Muller, Siemon—Stanford University, Calif.

Newcomb, W. A.—138 Dallas Road, Victoria, B. C.
Newton, J. Edward—92 Barnett Street, New Haven, Conn. Coll., exch.
Nicholls, Josephine L.—188 Franklin Street, Buffalo, N. Y.
Norman, Mary—Box 663, Sarasota, Fla. Coll., buy, sell.

Oldroyd, Ida S.—Stanford University, California. Phil. land shells sell. Wants any mollusks not in Univ. Coll.
Parks, H. B.—Texas Academy of Science, Route 1, Box 368, San Antonio, Texas.
Parks, H. B. Jr.—2501 Neuces, Austin, Texas.
Partridge, Alsa—369 Humboldt Parkway, Buffalo, N. Y.
Pate, Vernon S. L.—Entomol. Dept., Cornell University, Ithaca, N. Y.
Perry, Louise M.—The Manor, Albemarle Park, Asheville, N. C. Coll.
Phillips, William L.—759 Richmond Avenue, Buffalo, N. Y.
Pietroski, John—Boston, Mass.
Pilsbry, Henry A. — Academy of Nat. Sci., Philadelphia, Pa. Editor Manual of Conchology and *The Nautilus.*
Post, E. J.—12730 Chandler Blvd., N. Hollywood, Calif. Coll., exch.
Powers, Arthur C.—Box 270, Colorado Springs, Colo.
Price, Elizabeth Hoyt—370 S. 5th Street, San Jose, Calif. Nature Counselor Girl Scout Regional Camp.
Proctor, Mrs. Rodney—Banyan Road, Palm Beach, Fla.
Proctor, Beatrice—Banyan Road, Palm Beach, Fla.
Proctor, Hope—Banyan Road, Palm Beach, Fla.

Ramsden, Charles T.—Box 146, Guantanamo, Cuba.
Raymond, W. J.—Univ. of Calif., Berkeley, Calif.

Read, Capt. W. A.—Slip 54, Yacht Basin, St. Petersburg, Fla.
Rehder, Harold—1827 Park Road, N. W., Washington, D. C.
Richards, Horace G.—509 Woodland Ter., Philadelphia, Pa.
Ritchie, John—115 Washington Street, Malden, Mass.
Robertson, Harold R.—136 Buffum Street, Buffalo, N. Y.
Robertson, Imogene C.—Buffalo Museum of Sci., Humboldt Park, Buffalo, N. Y.
Russell, L. S.—Dept. of Mines, Ottawa, Canada.

Saunders, Felix—Dept. of Physiological Chem. and Pharmacology, Univ. of Chicago, Ill.
Schenck, Hubert G.—Dept. of Geology, Stanford University, Calif.
Schevill, W. E.—Museum of Comp. Zool., Cambridge, Mass.
Schmeck, Eugene—8711 Buffalo Street, Niagara Falls, N. Y.
Schmeck, Mabel—8711 Buffalo Street, Niagara Falls, N. Y.
Seymour, Mildred—283 Highland Avenue, Wollaston, Mass.
Sheldon, Pearl G.—Triphammer Road, Ithaca, N. Y.
Shields, Beulah E.—U. S. National Museum, Washington, D. C.
Shimek, B.—State Univ. of Iowa, Iowa City, Ia.
Smith, Allyn G.—722 Santa Barbara Road, Berkeley, Calif.
Smith, Burnett—West Lake Street, Skaneateles, N. Y.
Smith, Walter H.—1541 Kemble Street, Utica, N. Y. Coll., exch., buy.
Sneller, Charles D.—319-22 Jefferson Bldg., Peoria, Ill.
Snyder, N. Stanley—92 Indian Church Road, Buffalo, N. Y.
Snyder, Gladys A.—92 Indian Church Road, Buffalo, N. Y.
Snyder, W. E.—309 DeClark Street, Beaver Dam, Wis.
Spalding, Irwin W.—Box 2787, Honolulu, T. H.
Spicer, V. D. P.—U. S. S. Rigel, U. S. Destroyer Base, San Diego, Calif. Coll.
Sprague, Blessing—229 Chestnut Street, Pacific Grove, Calif.
Squires, Karl B.—268 Halcyon Arcade, Miami, Fla.
Stephens, Mrs. Frank—3746 Park Blvd., San Diego, Calif. Coll.
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Zetek, James—Drawer Z, Balboa, Canal Zone. Land and f. w. shells.

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To any one interested in joining The American Malacological Union we suggest addressing the member shown in list as living in your vicinity.

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BUFFALO MUSEUM OF SCIENCE
HUMBOLDT PARK :: BUFFALO, NEW YORK

THE
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— REPORT —

Fifth Annual Meeting

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THE AMERICAN MALACOLOGICAL UNION

FIFTH ANNUAL MEETING, BUFFALO MUSEUM OF SCIENCE, BUFFALO, NEW YORK, JUNE 27-29, 1935

The Buffalo Museum of Science was the scene of the Fifth Annual Meeting of the American Malacological Union on Thursday, Friday, and Saturday, June 27, 28 and 29, 1935. Chauncey J. Hamlin, president of the Buffalo Society of Natural Sciences, welcomed the delegates to the Museum when they assembled in the auditorium for the first session on Thursday afternoon. John E. Andrews, president of the Conchological Section of the Society, followed with words of welcome on behalf of local shell students. Calvin Goodrich, vice president of the Union, presiding in the absence of the president, William J. Clench, who was on an expedition to the Bahamas, called on Mrs. Ida S. Oldroyd, honorary president, for the response.

The meeting thus formally opened, the reading of papers followed. The first was by Joshua L. Baily, Jr. In his absence it was read by Imogene C. Robertson. Mr. Baily's paper presented a summary of views as to the systematic place of this puzzling group. It has been considered by various systematists as an independent order, a subclass of Cephalopoda, and a suborder of Gastropoda related to the Opisthobranchs, of which Pelseneer considers them modified forms, while Dall makes them the probable ancestors of the natatory species. Mr. Baily reviewed the arguments pro and con, concluding with the statement that "all that we are sure of today is the single fact . . . that the Paleozoic Pteropods have not been derived from the Mesozoic Opisthobranchs."

Professor Henderson, in discussing the paper, said that since nothing is known certainly about the anatomy of early Pteropods or in fact any other early molluscan forms, it is impossible to trace relationships to the original ancestor. He thought there was justification for considering the Pteropoda a distinct group or class.

"Collecting in Guatemala" was the topic of the paper by Henry Vander Schalie. A series of lantern slides illustrated his talk which graphically described the pleasures and thrills of various sorts experienced on the collecting trip in the Mayan country from which Dr. Vander Schalie and Professor Carl L. Hubbs had returned in May, They had represented the University of Michigan on the Carnegie expedition, the object of which is to ascertain if possible the reasons for the disappearance of the ancient Mayan civilization from the region which bears testimony to their former splendor in its magnificent ruins. The history of the fauna of the country has an important bearing on conclusions.

The Thursday evening meeting was held at Hotel Statler. A brief business session preceded the paper which was given by Professor Junius Henderson on "Methods of Dispersal of Mollusks." The widespread distribution of certain species as contrasted with the limited range of others gives rise to many interesting problems of distributional agencies, food conditions, temperature and ecological conditions generally. Adaptability is all important in the final results. In the dispersal of minute forms in an east-west direction the wind evidently has been an effective agent, while birds undoubtedly have played their part in the north-south distribution. Valuable data may be collected by careful observation, and the placing on record of new localities should be done at once.

Dr. Carlos E. Cummings, Director of the Museum, opened the sessions in the auditorium on Friday morning, recalling the origins of conchology in Buffalo when Elizabeth J. Letson was an enthusiast in the study and the organizer in 1899 of the Conchological Section of the Society of Natural Sciences which has been active during all the years since.

A brief paper on "The Development of Spines in *Melania setosa*" was presented by Calvin Goodrich. The lantern slide illustrations showed the manner in which the spine assumes its final shape by an outgrowth of shell substance continued as a bristle by the periostracum.

C. Austin Barker spoke on "Some of the Difficulties Encountered by Commercial Oyster Growers on the Pacific Coast." While the native species, *Ostrea lurida,* has not many enemies, the imported species, *O. gigas,* the Japanese oyster, commonly known as the Pacific oyster, falls victim to various foes. To the native species, *Crepidula fornicata,* the slipper-shell, becomes a menace because of its rapid increase in numbers, overburdening and eventually smothering the oysters on which they are attached. Among other enemies mentioned were ducks, crayfish, *Thais lamellosa,* and the Japanese and eastern drills. Starfish are not so destructive here as on the east coast.

Professor Henderson added the information that *Crepidula fornicata* is a nuisance in Europe also. Harold R. Robertson referred to a paper by Dr. Paul S. Galtsoff read at the meeting of the Union in Washington when he gave a wealth of information on the culture of oysters in the east.

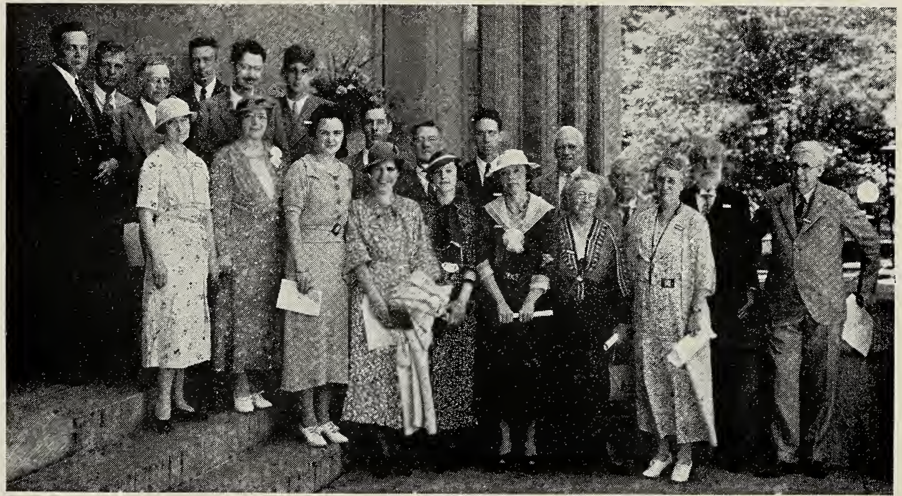
"Collecting Snails in Utah" illustrated by lantern slides was the contribution by Elmer G. Berry. Mr. Berry gave the number of species for Utah as 125. He traced the changing geological history of the region with its resulting change in molluscan life. Much of the area now is arid and collecting consequently poor in many localities. Bryce Canyon is one of these, but Zion Canyon will reward the collector more bountifully.

Replying to a question by Dr. Frank C. Baker, Mr. Berry said that species tend to concentrate, which led Prof. Henderson to mention this habit of *Oreohelix* which may be found often packed solid under some covert, a thousand or more together.

"Fossil Non-Marine Mollusks of North America" by Junius Henderson showed the importance of mollusca in the interpretation of geological deposits. The wider the distribution of a species the greater is its value in stratigraphy. Prof. Henderson's paper was a resumé of one to be published in July of this year by the Geological Society of America under the Penrose Fund. He lists 796 species, 40 of which were described since the paper was accepted for publication. Of the entire number 276 were Pelecypods and 520 Gastropods.

Dr. Baker rose to pay tribute to the value of this contribution to all workers in the field of North American mollusca.

BUFFALO MEETING OF THE AMERICAN MALACOLOGICAL UNION



Courtesy of the Buffalo Museum of Science

BACK ROW: *Eugene H. Schmeck, Henry Vander Schalie, Frank C. Baker, Elmer G. Berry, Charles H. Blake, Richard W. Foster.* MIDDLE ROW: *Mrs. Eugene H. Schmeck, Mrs. Fred St. John Hoffman, Harald A. Rehder, Harold R. Robertson, C. Austin Barker, Junius Henderson, John E. Andrews, Norman W. Lermond, Calvin Goodrich.* FRONT ROW: *Eunice E. Strickler, Bernadine Barker, Mrs. Charles H. Blake, Anne Harbison, Ida S. Oldroyd, Imogene C. Robertson.*

Mrs. Ida S. Oldroyd in her paper, "Eight Weeks on the Dredge Boat and Its Results," told how mollusks were collected in July and August, 1934, during dredging cruises off the east coast at Vancouver Island, B. C. and the mainland. Two new species from material collected have been described, *Leda austini,* named for Mrs. Oldroyd's assistant, C. Austin Barker, and *Pecten hindsii clemensi,* in honor of Mrs. W. A. Clemens. One of the most interesting finds was that of live pteropods, fascinating to watch in their graceful swimming motions.

"A Mollusk New to the Great Basin" by Calvin Goodrich showed a shell corresponding most nearly to *Goniobasis newberryi* to be the bearer of this distinction. It occurs in Long Valley, Washoe County, Nevada.

An illustrated talk by Frank Collins Baker entitled "Some Land Shell Localities in Illinois" concluded the formal program. This was an account of a survey conducted in 1931-32 in which the southern and western parts of the state were thoroughly studied, the only regions not previously covered intensively. An interesting picture shown was a bit of uncultivated region at New Harmony where Thomas Say collected long ago.

Stating that the American Malacological Union now is entering its fifth year and so is old enough to have traditions, Mr. Goodrich called upon Norman W. Lermond who was responsible for the organization, to recount how the idea originated. Mr. Lermond responded with a brief history of his work in arousing interest, first in William J. Clench when he was working with him at Harvard, and later by means of letters to students and collectors throughout the Americas, written during his sojourn in Florida in the winter of 1930-31.

The annual dinner was held at Hotel Statler on Friday evening and proved a happy climax for the activities of the meeting. Mr. Goodrich called on Mr. Andrews, Dr. Baker and Prof. Henderson whose interesting responses enlivened the pleasant occasion.

Saturday had been designated for a field day. At 9:30 the party of twenty left Buffalo in autos for East Aurora where the Roycroft Shops, established by the late Elbert Hubbard, "Fra Elbertus," were visited. Here the party was met by William Wild, Associate in Entomology of the Buffalo Museum of Science, who acted as guide to the collecting ground in Cazenovia Creek and along its wooded banks. *Lymnaea auricularia* recently has made its appearance here among the native inhabitants, *Goniobasis, Physa* and others.

Luncheon at Roycroft Inn, leave taking of Dr. and Mrs. Charles H. Blake of Boston, Mr. Lermond and Mr. Andrews; then on to Niagara Falls, forty miles away. At the foot of the American Falls collectors were drenched with spray as they gathered from the wet grass and moss on the rocks, the tiny *Pomatiopsis* and a minute *Lymnaea* with *Succinea, Haplotrema* and *Zonitoides.* It was with reluctance that this collecting field was left, but time was short and another interesting locality was to be visited.

Crossing the river at Lewiston to the Canadian side, the return to Buffalo was begun with a stop at Niagara Glen, formerly "Foster's Flats", en route. Here where huge blocks of fallen rock lie at the foot of the cliff over which the cataract once poured, various land snails find a congenial home, *Anguispira, Mesomphix* and several species of *Polygyra.* Pleistocene fossils may be found here too, in the bank far above the present level of the river. Harald A. Rehder found this spot too attractive to leave when the time scheduled for departure arrived, but the rest of the party proceeded to Buffalo via the Peace Bridge and the Fifth Annual Meeting was concluded.

The Council for the ensuing year consists of the following: Ida S. Oldroyd, Honorary President; Calvin Goodrich, President; Joshua L. Baily, Jr., Vice-President; Norman W. Lermond, Corresponding Secretary; Imogene C. Robertson, Financial Secretary; Paul Bartsch; William J. Clench; Junius Henderson; Henry A. Pilsbry.

At the business meeting held on Thursday evening a resolution was passed that the Union petition the New York State Museum to hasten if possible the publication of the work by Dr. Henry A. Pilsbry on the New York State Mollusca the manuscript of which was completed some years ago. It is much needed.

Capt. W. A. Read's invitation to hold the meeting for 1936 in St. Petersburg, Florida, was accepted with pleasant anticipations. Invitations to Ann Arbor in 1937 and San Diego in 1938 have been received with appreciation and tentatively accepted.

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Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. Annual dues, $1.00. There are no initiation fees. Address the Financial Secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Humboldt Park, Buffalo, New York.

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Editors and Publishers:
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Academy of Natural Sciences, Philadelphia
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Sixth Annual Meeting

Saint Petersburg, Florida

April 21-24, 1936

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Membership List

Revised, September 1, 1936

SIXTH ANNUAL MEETING

OF THE AMERICAN MALACOLOGICAL UNION, ST. PETERSBURG, FLORIDA, APRIL 21-24, 1936

The Sixth Annual Meeting of the American Malacological Union was opened on Tuesday morning, April 21, 1936, in the Detroit Hotel, St. Petersburg, Florida, with a welcome by the Mayor of the City, the Honorable John S. Smith. He was introduced by Captain W. A. Read, at whose invitation the meeting was held in this city. Captain Read's love for St. Petersburg was voiced in the original poem which he recited in presenting the Mayor, who facetiously remarked that he would not present the Key of the City because nothing was locked against the delegates.

A welcome from the St. Petersburg Chamber of Commerce was extended by M. M. Deaderick, Secretary of the organization. Roy Hanna, Vice-President of the Pinellas Institute of Natural Science, was presented by Norman W. Lermond. He welcomed the delegates on behalf of the scientists of St. Petersburg, while shell lovers of the city extended their greetings through Dan L. Emery, President of the recently organized St. Petersburg Shell Club. Calvin Goodrich, President of the Union, responded in fitting words of appreciation.

The first in the program of scientific papers was by Professor Junius Henderson, entitled, "Is Concealing Coloration Important to Molluscan Life?" The speaker made a distinction between concealing and protective coloration. Coloration not at all concealing, such as some white desert snails, may be protective for other reasons, and concealing coloration would be entirely ineffectual in protection of the organism from enemies that have no color vision. Professor Henderson concluded his talk by saying that after having observed this point for many years in his collecting in many states, he has seen no case in which it could be stated definitely that such concealing coloration is of value to the mollusk.

Dr. Henry A. Pilsbry, in discussing the paper said that the white shells of *Bulimulus* are opaque and so constitute a real protection from the hot sun. *Achatinellidae,* however, are very hard to see in the trees because of their color patterns, one instance in which concealing coloration may be of value. Dr. Paul Bartsch said the paper was a timely one especially to those who are living in Florida where there are unusual opportunities for observation. He remarked that museum workers get only the "bones" and urged students to observe the living mollusks, comparing observations during the day with those made at night. Mr. Goodrich thought that coloration in some shells may be tied up with the chemistry of food and water.

"The Status of the Family *Cardiidae*" by Miss A. Myra Keen, of Stanford University, was read by Dr. J. P. E. Morrison. Dr. Keen considers that a thorough revision of the family is needed because of the numerous synonyms which have arisen and also because of more recent knowledge concerning the range of genera and species.

Joshua L. Baily, Jr., was the first speaker in the afternoon. His topic, "Stabilization of Nomenclature," was a plea for the American Malacological Union to appoint a committee on nomenclature and terminology to officiate in an advisory capacity, its recommendations to be published in the Annual Report, and quoted thereafter as "AMU 1937" etc. If publication entails cost this might be covered by a contribution from those who ask advice or advice might be restricted to members. Mr. Baily asked for discussion.

Dr. Pilsbry in leading the discussion referred to the International Commission on Nomenclature and the fact that their decisions frequently are wrong. He saw where such a committee as that suggested by Mr. Baily might function advantageously by first calling for suggestions and discussion before making recommendations to the Commission. Mr. Goodrich thought that Dr. Pilsbry, as editor of the *Nautilus* should pass on such recommendations. Dr. Bartsch called attention to the fact that not only must literature be available but material for comparison as well. Malacology, he said, is still in its infancy and it is fortunate that changes in nomenclature do not go through too quickly. Suggested changes at present are brought to Pilsbry and Bartsch before the Commission decides. He suggested a system similar in operation to that employed by the American Ornithological Union.

Professor Henderson referred to his paper given before the fourth annual meeting at Stanford University in 1934 when he spoke on "Our Unstable Biological Classification and Nomenclature," urging a more conservative policy of changes. This principle he reaffirmed stating his belief in the value of stability rather than constant change even when the change may be right so far as priority is concerned. Thus, a long established name should take precedence over one long forgotten. Since the International Commission deals with everything, it is practically impossible for them to decide in minor matters. Especially is this true in the case of molluscan names. Those studying mollusks constitute a very small group in comparison with those in most other fields involving such decisions. The Union could appoint a committee of experts, not to settle all nomenclature but to function when someone has a specific question, this to be submitted to the committee for final decision and recommendation to the International Commission.

Dr. Paul Bartsch presented a valuable paper on "Intermediate Molluscan Hosts of Asiatic Blood Flukes." This was an abstract of a new publication by the Smithsonian Institution on Dr. Bartsch's investigation into the molluscan species which are responsible for the perpetuation of these parasites. Dr. Bartsch's studies have cleared *Blandfordia* of guilt as a host for the fluke which causes schistosomiasis and definitely fastened it upon three genera, *Katayama, Oncomelania,* and *Schistosomophora.* Since these genera, whose species are carriers, live where an acid condition of the soil exists, Dr. Bartsch recommends the use of crushed limestone over such areas in quantities sufficient to change the acid condition to an alkaline one and so create an unfavorable environment for these mollusks. The molluscan hosts thus eliminated, the disappearance of the parasite should follow.

"The Evolution of the Genus *Liguus* in Florida" by Henry G. Frampton was illustrated by a phylogenetic chart of shell arrangement covering important species and varieties of this variable genus as found in Florida. Mr. Frampton said it would require 1200 specimens to illustrate the entire color range. He reviewed the study of the genus from the first description of *Liguus solidus* by Say one hundred and twelve years ago to the present when many investigators have entered the field. In 1912 Dr. Pilsbry described twelve subspecies and in 1920 Dr. Charles Torrey Simpson described eighteen more. Mr. Frampton said that there still remains territory to be explored and urged that more work be done.

Dr. Pilsbry said that he had dropped "Ligs" twenty years ago and was glad that the younger men have carried on. In further discussion of the paper the question of experimenting in hybridization was raised, and Dr. Pilsbry remarked that it is difficult to breed these snails because of the food problem. They live on a small lichen which grows on certain smooth-barked trees and is not easily obtained for experimental purposes. Thus far, the young of *Liguus* have survived only about six weeks in captivity. Dr. Bartsch said that it was unfortunate that these snails will not breed successfully in captivity, but since Florida is one of the most perfect natural laboratories in the world he suggested transplanting forms to selected localities where they could be kept under observation.

In the evening Dr. Pilsbry spoke on "Three Naturalists in Mexico," illustrating his talk with lantern slides showing views taken during his two summers spent in studying the molluscan fauna of Northern Mexico. By automobile and packsaddle he and his two companions traveled several thousand miles in their quest for shells exploring in remote and sometimes not easily accessible areas. Their object was to learn the range of certain species beyond the United States border and to ascertain the southern limit of *Sonorella* and *Ashmunella*. Dr. Bartsch expressed the wish that Dr. Pilsbry may continue his exploration and report at the next meeting.

On Wednesday morning scientific sessions were resumed with a discussion by Dr. Carlos de la Torre on "A Revision of the Cuban Genus *Polymita*." A study of the mollusca of Cuba proves the relation between its three natural divisions. Cuba appears to have been originally three islands now coalesced and occupying positions as the Eastern, Western and Central portions of the one island. The molluscan forms in these areas are distinct. By means of outline maps of Cuba on which he indicated the range of varieties with colored chalk, this was graphically illustrated. Beautiful color plates of different varieties were exhibited as well as a magnificent series comprising 2800 specimens arranged in 28 glass covered trays.

On reconvening in the afternoon Dr. Pilsbry offered a resolution which was seconded by Paul P. McGinty and carried unanimously, that in view of the importance of Dr. de la Torre's studies and the desirability of having them published, the Union desires to recommend to the Carnegie Institution of Washington the publication of Dr. de la Torre's studies on distribution and variation of the Cuban Tree Snail Genus *Polymita*.

Mr. A. La Rocque, of the National Museum of Canada, read a paper entitled "Plan for the Study of Canadian Mollusca." Mr. La Rocque's plan suggested covering such points as distribution, description, type, anatomy, synonyms and bibliography with carefully kept records cross indexed.

Dr. J. P. E. Morrison, of the United States National Museum, spoke on "Growth Rings and Size of Shells," giving the results of his studies on thousands of specimens of *Viviparus contectoides, Sphaerium* and others, which had been carefully cleaned and measured. Graphs were exhibited showing the life span of these species and the number of rings to a season. The *Sphaerium* studied has a two year life history, the mature shells exhibiting eight rings. This suggests the question as to what in environment besides cold weather produces four growth rings a year.

Dan L. Emery, speaking on "Shell Collecting in Florida," gave a history of his experiences during his twenty years of residence in the State.

Mrs. Ida S. Oldroyd exhibited a curious oyster shell in illustrating her talk on "An Interesting Oyster from the Olympian Beds." It had grown into crescentic shape suggesting an ammonite. Its identity was uncertain because of its unusual character of growth.

Dr. Paul Bartsch read from the introduction of a recently completed paper by Dall, Bartsch and Rehder, on "Recent and Fossil Pelecypod Fauna of the Hawaiian Islands," studies on the collection made by D. Thaanum to which the Smithsonian Institution had fallen heir. These volcanic islands rise from 12,000 to 18,000 feet above the ocean floor, their situation indicating a line of weakness in the earth's crust from which molten lava has built up cone after cone. Isolated by about 2,000 miles from other land, no land bridge could have existed at any period. There thus are only two ways to account for the introduction of fauna—first by the swimming of larval forms from remote shores, which would be almost impossible, and secondly by drifting trees to the roots of which earth might cling carrying mollusks with it. This latter is the most logical method by which pelecypods could have arrived. There are on the islands 106 genera and sub genera of marine bivalves of which 23 were previously unknown and 190 species and sub species, 137 of which are new. Seventy-two per cent of these are peculiar to the islands.

Captain W. A. Read was scheduled to present a formal paper on "The Peculiar Distribution of Invertebrate Marine Fauna Along Certain Parts of the West Coast of Florida." However, as time for papers was becoming short, he spoke for a few minutes only on collecting local mollusks.

Professor Henderson concluded the program of papers with a discussion of "The American Genus *Oreohelix*." This is a distinctly Western genus and a difficult group to study unless a quantity of material is available, because of the varieties in sculpture and the differences between young and adult in this feature.

The evening was given over to informal talks by visitors, Mr. Goodrich presiding. Dr. Frank Smith, of the University of Illinois, was asked to speak on "Earthworms," responding with a delightful account of these creatures, of which so little is known by any but the specialists. There are over two thousand different kinds of earthworms in the world and more than sixty in North America alone. He told of South American worms which measure two feet in length while one Australian species is nine feet long. Miss Anne Harbison told of her work on fossil shells with Dr. Pilsbry. Calvin Goodrich recalled interesting adventures of early conchologists in their quest for shells. He himself had been an amateur in the study for many years before he retired, becoming professional when he took up museum work. Walter F. Webb and Captain Read also contributed interesting accounts of "shelling" by themselves and others.

On Thursday morning members assembled at the Detroit Hotel for an auto trip to Tarpon Springs and the Gulf Beaches. At Tarpon Springs the party was conducted first to the Sponge Exchange, said to be the largest in the world, where Mrs. George M. Gordon, of the St. Petersburg Shell Club, introduced Mr. E. P. Macrenaris, veteran Greek sponge diver, who reviewed the history of the sponge industry in Florida. The sponge fishing boats, the largest such fleet in the world, lay at anchor in the bay and formed an interesting sight. The numerous curio shops of the town were visited, where shells brought in by the divers were to be obtained. Luncheon was served in the Green Garden Restaurant. The remainder of the afternoon was spent in collecting shells along the various beaches which make this region so fascinating to shell lovers.

The annual dinner and business meeting in the Y. W. C. A. Hall occupied the evening, Dr. Paul Bartsch presiding in the absence of both president and vice-president, who had left early for their return trips. Dr. Bartsch in calling on Dr. Carlos de la Torre for a few words, spoke feelingly of those brilliant men who were instrumental in commencing malacological work in Cuba—Pfeiffer, Gundlach and Poey, whose mantles have fallen on Dr. de la Torre's shoulders. In responding, Dr. de la Torre extended a cordial invitation to the Union to meet in Havana next year. Since, however, an invitation to hold the 1937 meeting in Ann Arbor had already been accepted, Dr. de la Torre's invitation was accepted for 1938. Mr. Lermond later set forth the advantages of Maine for a place of meeting, suggesting Thomaston for 1939. In his further remarks Mr. Lermond paid a tribute to Dr. Dall and his promptness in responding to inquiries and requests for identification of specimens. Dr. Bartsch said that the Smithsonian Institution should be asked to put on permanent record the work of Dr. Dall. Professor Henderson moved the drafting of a resolution by Mr. Robertson and Dr. Bartsch strongly urging that a biography and bibliography of Dall be published by the Carnegie Institution of Washington. Seconded by Mr. Lermond and Captain Read. Carried. Dr. Bartsch then presented to Captain Read a little book containing the autographs of all members of the Union in attendance at the Convention in token of their appreciation of his invitation to hold the 1936 meeting in St. Petersburg and of his many kindnesses during their stay. Captain Read expressed his deep appreciation of this recognition.

Mr. Lermond moved that a committee be formed of nine members to organize a systematic check list of North American Land and Freshwater Shells north of Mexico—one each for the Northwestern and Southwestern States, the Rocky Mountain Region, the Central Plain Region, the Mississippi Valley, the Northeastern and Southeastern States, Western Canada and Eastern Canada. This committee to elect its own chairman and secretary. Seconded by Mr. La Rocque and carried.

Resolutions of appreciation were adopted to be sent to the Mayor of St. Petersburg, the St. Petersburg Chamber of Commerce, the St. Petersburg Shell Club, Captain W. A. Read, the management and personnel of the Detroit Hotel, and the Local Press. Dr. Bartsch in closing spoke of the work of those valiant souls, William Healey Dall, John B. Henderson, Charles Torrey Simpson, and Victor Sterki, who have so recently ceased from their labors, and asked that the assembly before dispersing, bow their heads in silent tribute to their memory.

As guests of Captain Read on his yacht *Casanova*, Shell Island was visited on Friday. An early start was made for the pleasant two hours' ride on Tampa Bay to the little island which is a favorite resort for shell collectors. To the visiting members of the Union it was a delightful experience to gather shells along the beaches so rich in varied forms. Birds, too, claimed their share of attention, and some terns' nests were discovered in the sand among the low shrubs above the level of the tide. Luncheon was served on the yacht and another islet visited after which the boat was turned homeward. St. Petersburg was reached at the close of the afternoon and the party disbanded with hopes of meeting again in Ann Arbor in 1937.

Officers were elected as follows: Mrs. Ida S. Oldroyd and Dr. Henry A. Pilsbry, honorary presidents; Joshua L. Baily, Jr., president; Dr. Carlos de la Torre, vice-president; Norman W. Lermond, corresponding secretary; Mrs. Imogene C. Robertson, financial secretary. Members of the Council additional to officers: Dr. Paul Bartsch, William J. Clench, Calvin Goodrich and Professor Junius Henderson.

ACTIVE MEMBERS

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Vanatta, E. G., Academy of Natural Sciences, Philadelphia, Pa.
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Van Hyning, T., Florida State Museum, Gainesville, Fla.
Van Woert, Mr. and Mrs. M. P., 2910 Tenth St., N., St. Petersburg, Fla.
Vaughan, T. Wayland, Director, The Scripps Inst. of Oceanography, La Jolla, Calif. Coll. Cenozoic and recent Mollusks

Walworth, Mrs. Ruth, 126 4th Ave., N. E., St. Petersburg, Fla.
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Wright, Berlin Hart, 1123 S. Johnson Ave., Lakeland, Fla. (Oct. to May); Penn Yan, N. Y. (May to Oct.)
Wright, Mrs. Christina, Zool. Dept., Indiana University, Bloomington, Ind.

Yawger, Eliza F., 101 N. Grove St., E. Orange Hotel, East Orange, N. J.

Zetek, James, Drawer Z, Balboa, Canal Zone. Land and f.w. shells

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Seventh Annual Meeting
University of Michigan Museum
Ann Arbor, Michigan
August 3-5, 1937

Membership List

Revised, January 1, 1938

THE SEVENTH ANNUAL MEETING

OF THE AMERICAN MALACOLOGICAL UNION IN THE MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, AUGUST 3 TO 5, 1937

Midsummer in Michigan proved to be all that could be desired for the Seventh Annual Meeting of the American Malacological Union in Ann Arbor, August 3 to 5, 1937. From the first words of Mr. Frederick M. Gaige, Director of the Museum of Zoology, on Tuesday afternoon, to the farewells by Mr. and Mrs. Calvin Goodrich on Thursday, this meeting was a delightful occasion, marked by happy reunions of old friends and equally pleasant meetings with new ones.

In his welcome to the Union Mr. Gaige said that one of the first acts of the State Legislature after Michigan was admitted to statehood one hundred years ago was to institute a natural history survey to be conducted by the Cabinet of Natural History. This survey was commenced in 1838 and prosecuted vigorously, bringing into prominence a galaxy of men whose names have become known among scientists everywhere. Some of these, especially revered among malacologists, were Abraham Sager, Manly Miles, Alexander Winchell, J. B. Steere and Bryant Walker. The last of these had been an honorary member of the American Malacological Union. His death occurred a little over a year ago and his comprehensive library of conchological literature and his vast collection of shells were bequeathed to the Museum of Zoology where members were invited to inspect them at their convenience. Mr. Gaige also extended an invitation to luncheon on Wednesday in memory of Dr. Walker concluding with the assurance that the Union is welcome now and always.

In responding Mr. Joshua L. Baily Jr., president of the Union, expressed the thanks of the visitors for the cordial welcome received and the interesting historical notes presented. He also voiced appreciation for the opportunity of an inspection of the Walker collection and the pleasure with which it was anticipated.

The first paper on the program was by Dr. Harald A. Rehder entitled "Some New Light on Bolten's Catalogue." It was read by Dr. Paul Bartsch. The author concludes from a careful study of contemporary data that the catalogue in question was probably published in 1798, some five months before the publication of Lamarck's work. Bolten's genera are therefore valid and available, but it is a question whether the specific names here proposed are available, as the work is not consistently binomial.

Dr. Henry A. Pilsbry, in the discussion following, voiced his objection to using Bolten's names because of the excessive rarity of his catalogue, only about six copies being known. One only is in America, that owned by the late Dr. Dall. Under these circumstances it should have been considered as unavailable for nomenclature. But since Dall used it and his prestige brought the names into general acceptance, it is better now to waive the question. It is of no advantage to science to change generic names which have become established as some of these have. After some further discussion it was moved by Dr. Bartsch: That Dr. Rehder be asked to petition the International Committee of Nomenclature to suppress Bolten's specific names. This was seconded by Dr. Pilsbry and carried.

Dr. Rehder then spoke briefly on "Martyn's Universal Conchologist." He said that Martyn used a very strange system of nomenclature in this work, one which evidently was his own invention; and since such terms could have no chance for survival they should not have been considered available.

Dr. Elmer G. Berry was the next speaker, his subject being "The Discovery of Living *Pyrgulopsis letsoni* (Walker)." He spoke of the thrill with which a new expedition is undertaken in anticipation of finding new forms. There is another thrill which comes when unexpected species turn up in the re-examination of old stamping grounds or when careful search brings to light a form long sought. It was in 1901 that Elizabeth J. Letson gathered some fossils on Goat Island in Niagara River. Among them was a tiny Amnicolid which Dr. Bryant Walker named in her honor *Amnicola letsoni.* In 1906 dead shells were found on Lake Erie beaches, then on those of Lake Ontario, and later, along the Maumee and Huron Rivers. A study of these shells convinced Mr. Calvin Goodrich that the species was a *Pyrgulopsis.* The finding of fresh specimens in a drained pond formed by the overflow of the Huron River incited Dr. Berry to a renewed search for living forms which finally were discovered in the pits of an eroded boulder dredged from the river. This discovery made it possible to conduct a careful study of the habits of the tiny animal in an aquarium. Eggs were laid and the life history observed.

Lantern slides showed the animal and characteristic features of its anatomy. Some discussion on the radula brought out the explanation by Dr. Berry that since *Pyrgulopsis* lives on diatoms the radula is used as a comb or strainer. Mrs. Harold R. Robertson of the Buffalo Museum of Science exhibited specimens of this species which she had received for identification from the New York State Biological Survey, collected in Lake Chautauqua in July.

A series of thirty species of Pectens was exhibited by Mrs. Ida S. Oldroyd who was the next speaker, her topic being "Certain Pectens of the Pacific Coast." The characteristics of various species were pointed out, among them her new *Pecten clemensae* and *P. newcombi.*

The next paper by Dr. Paul Bartsch was entitled, "Problems in Distribution." He stated: The study of the mollusks obtained by the Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep has made it necessary to subject the entire West Indian fauna to a critical analysis, and this has brought to light some exceedingly interesting problems in zoogeographic distribution.

Through block faulting, deep channels of considerable width have come into existence and separate a definite number of West Indian blocks. These channels are sufficiently deep to prevent littoral species from crossing them, that is, such species as do not have free-swimming larval forms and even such as have would have a hard time to cross since the currents sweeping through these channels would carry them to sea, or into the Gulf or Caribbean. It is therefore not surprising that through this isolation and inbreeding sufficient minor characteristics to differentiate the denizens of the various blocks should have been developed. This appears to be actually the case. The surprising part, however, was not the finding of differences in these divers blocks, but equally pronounced differences in the shells of species living on the Atlantic side, and the Gulf or Caribbean side of the chain, for one would naturally expect littoral forms to creep around each one of these isolated blocks, and thus produce a homogenic fauna occupying the shore line of each, which, as above stated, is not the case.

The causes for this differentiation have been explained in part by the hydrographic studies of the Johnson-Smithsonian Deep-Sea Expedition, and even more so by the work of the *Atlantis,* which have definitely shown that the Atlantic side of the West Indian chain is bathed with Atlantic water, which has an entirely different hydrogen ion concentration from that of the Gulf or the Caribbean, the latter receiving the fresh waters pouring into them from the adjacent shores, as well as the rains contributed to these large bodies of water. This dilution produces an entirely different environment on the Gulf and Caribbean side from that of the Atlantic side of those islands, and is responsible for the biologic findings.

Malacologists will, therefore, do well when working in West Indian waters to keep these points in mind and not content themselves by tabulating their specimens, West Indies, Puerto Rico, Cuba, etc., but cite specific localities with their catch.

Dr. Allan F. Archer suggested that possibly physical conditions of the islands coincide with currents and other features of the water on the Atlantic and Caribbean or Gulf sides such as that often observed in fresh water lakes on different sides. Dr. Horace B. Baker spoke of the effect of rainfall on the salinity of the Gulf and the Caribbean. Mr. Tom McGinty cited Lake Worth as an instance of a freshwater lake which has become salt and in which, although much fresh water comes in, there are many more salt water species than in the open sea. Dr. Phil Spicer asked if the fauna of the smaller Leeward Islands is Atlantic or Caribbean, to which Dr. Bartsch replied that there is not sufficient data at present to report definitely.

The next paper was also by Dr. Bartsch, and was entitled, "Goniobasis Breeding." The speaker called attention to his Cerion breeding on the Florida Keys which began in 1912 and is still in progress, and summed up his experiences by stating that this work has led him to believe that environment (as far as Cerions are concerned) plays a small role in producing changes in this genus. The only effect observed was a lethal one when they were placed under unsuitable conditions. He has found, however, that hybridization produces mutation in the de Vriesian sense, and he believes that by isolation of these mutations we may obtain fixation which in turn will result in speciation.

In order to have a check upon this concept, Dr. Bartsch has undertaken a parallel set of experiments with another group of mollusks, namely, the *Goniobasis* of the Potomac River Valley. He stated that in the Shenandoah Valley and above the fall line in the Occoquan Creek, the adult shells are smooth, usually olive, frequently with a brown peripheral band, while in the lower Potomac, from Mount Vernon south, the multilirate form only is present. Here the shells are always supplied with spiral threads, are of quite uniform size and of dark coloration. In the Washington region there is an enormous amount of variation the shell varying from one to ten in size, as far as shell capacity is concerned. The color may be anything from pale olive to dark brown, unicolor or banded. The sculpture varies from smooth to spirally lirate and even axially ribbed. This same "mutating" condition he found to extend at least as far north as Harper's Ferry in the Chesapeake and Ohio Canal, through which mollusks have apparently been carried and distributed by coal barges that used to ply this waterway. He stated that it was interesting to note as one collects from Harpers Ferry southeastward that on the Virginian side below the Shenandoah, the Shenandoah forms continue down to Seneca with little admixture of the mess that occupies the canal, while on the Maryland side adjacent to the canal, the canal fauna influence makes itself felt all along this reach.

The experiments undertaken consist of making cages with one yard square one inch thick concrete bottom, and placing on this Monel metal wire cloth, 18 inches high, 20 x 20 to the inch mesh, .016 inch diameter, and the top of 10 x 10 to the inch mesh, .025 inch Monel metal wire cloth. Three of these cages were placed below the hydroelectric plant at Millville, West Virginia, three in the Roaches Run Bird Sanctuary at Washington, and three at the Bureau of Fisheries Station at Fort Belvoir. In the cages at Millville, which were put in the water in October, 1935, were placed 100 tips of the season from the Washington area in one cage; in another, 100 from Dawson's Beach, while in the third were placed 100 each of the smooth tips gathered above the fall line in Occoquan Creek and 100 from Dawson's Beach; that is, this cage contained both the smooth and spirally lirate elements. In the cages at the Roaches Run Bird Sanctuary were placed in one 100 tips of the season from Occoquan Creek; in another 100 from Dawson's Beach and in the third 100 each of the smooth forms from Occoquan Creek and Dawson's Beach. At Fort Belvoir were placed in one cage 100 tips of the season of the Occoquan Creek shells, in another 100 tips of the Washington area and in a third 100 each of the Occoquan Creek and Dawson Beach tips.

When Millville was visited on August 3, 1936, it was found that the flood which had swamped the Shenandoah Valley had completely buried the cages under more than a foot of mud, killing everything. In the Roaches Run Bird Sanctuary the cages were almost half buried in mud due to the same causes, but here the *Goniobasis* had survived and a goodly number had attained mature size. There were also some young, but the cages were somewhat damaged and were therefore taken up with the intent of suspending them instead of placing them on the bottom. Greatly to the surprise of the experimenters in one of the cages specimens of *Anodonta cataracta* Say were found with eight annulations one measuring 66.2 mm. in length, 40.0 mm. high and with a diameter of 19.3 mm. This would indicate that annulations must not be taken as an indication of year marks. There were also a number of other species of mollusks present, as well as crayfish and fish. The *Anodonta* must have entered through the top of the cages as glochidiae and the fish probably as eggs. A detailed report of this is to be made later.

The cages at Fort Belvoir were also found about one-third buried in mud and one badly damaged, but these also contained Anodontas, telling the same story. So far then it may be said that these experiments represent a progress report. This fall Dr. Bartsch plans to return the nine cages, each battery of three in a cypress frame suspended from two metal drums with the top of the cage about 18 inches below the surface of the water. The bottom of the cages will be changed by replacing it with cypress and covering with a thin coating of concrete. The fauna of these cages will be increased from 100 to 500 tips and in the mixed cage will be placed 500 each, i. e., a thousand instead of two hundred.

"Post-glacial Re-population of an Area of the Huron River Valley of Michigan" was the title of the next paper by Mr. Calvin Goodrich. The studies on which it was based were conducted in a little ravine on the north side of Ann Arbor. Lake Maumee was the earliest of glacial lakes and this ravine has been unsubmerged since it drained away. At the bottom a trench nineteen feet deep was excavated by a student investigating pollens of the peat. Shells were discovered in this trench rating from 15,000 to 50,000 years ago. A study of these shells revealed the history of conditions at various levels with a gradual increase of terrestrial forms both in number and species from the bottom to the top.

The paper was discussed by Mr. Baily, Dr. Baker and Dr. G. E. Fairbairn.

"Systematic Aspects of Shell Growth" by Dr. Horace B. Baker stressed the value of studying the young shell as well as the adult. As conchologists we forget that the shell is a part of a living animal and that it grows by the addition of material at the edge of the mantle. In the adult shell one is not always sure that the apical whorls are as they were originally. They frequently are worn away. In some mollusks growth ceases after sexual maturity; in others, just before sexual maturity is attained. In certain groups the shells are sexually mature at three whorls but continue growth almost indefinitely. All shells vary much at the time when growth ceases. Thus counting whorls is important and should be done much more accurately than has been the practice with many. It is important to determine first where growth starts. Then place the apical whorls in exactly the same position for comparison and count toward the aperture.

Dr. Bartsch recalled that at the first meeting of the Union he complained that Museums get only the bones as he called the shells, and that the biogenetic law is still in effect, that the ontogeny of the individual repeats the history of the race, that the various stages of growth are reminiscent of the changes through which the ancestors of a species have passed, and of much phylogenetic value. Dr. Bartsch further stated that museums have the greatest difficulty in obtaining good apical whorls and put forth the plea to hunt for specimens perfect in this respect.

The presidential address was the subject of the evening program, Mr. Baily choosing for his topic "The Colony of *Helix nemoralis* at Burlington, New Jersey." This was a summary of studies made by the speaker and Dr. Pilsbry in preparation for a joint paper on the evolution of this colony. Introduced into Burlington from Sheffield, England, in 1857 by Dr. W. G. Binney, they increased to such an extent that in 1865 he wrote that the whole town was full of them, though not extending beyond its corporate limits. Cattle, sheep and swine contributed most to restricting their range. There is no record of the characteristics of this first colony but all the Burlington shells collected fall under two classes, pink and yellow with various degrees of peripheral and supernumerary banding. The present studies were made on shells collected from seven localities over a period of twenty-four years. Binney's home has become a Roman Catholic institution with well kept grounds and consequently no snails exist there at present. The most prolific collecting grounds are greenhouses and cemeteries in which marble headstones are the fashion, seventy-five percent being taken from the latter type of habitat. The results observable indicate that lime tends to give a solid color, peripheral banding being apparently due to lime deficiency. The changes noted in the shells taken from the several localities seem to indicate that certain types are being eliminated and others developed in favor of the bandless forms.

Dr. B. R. Bales suggested that the preponderance of banded forms in the earlier collections may be explained by the natural impulse to collect only the more attractive shells or those with bands, while the more careful collecting of recent times includes all varieties. Mr. Goodrich spoke of the effect of food on pigmentation and cited some experiments conducted in England on banded specimens of *Thais lapillus* living on Mytilus. When these banded individuals were removed to barnacle beds the banding stopped. On returning them to the Mytilus diet the banding was resumed. Dr. Pilsbry said there is good reason to believe that peripheral banding is not due to inheritance. It evidently is older than the bandless condition. The five-banded forms are members of a special group.

Dr. Bartsch remarked on the paucity of our knowledge regarding the ancestral forms of all but certain groups. We have no knowledge of what is at work to produce the changes observed except that some internal mechanism is acted upon by external environment. He suggested that a splendid line of work would be to segregate forms long enough to develop pure strains. Then hybridize and note results. In this way what is due to environment and what to gene effect may be determined. Dr. Baker suggested that crossing might better be accomplished with some mollusk like Goniobasis rather than with *Helix nemoralis* because there is no way of telling in the latter species what proportion are cross- or self-fertilized.

Mr. Baily exhibited numerous series of *Helix nemoralis* presenting all degrees of banding, from the different localities mentioned.

On Wednesday morning Mr. Goodrich created a pleasant thrill of anticipation by the announcement at the opening of the meeting, that duplicates from the Walker collection would be available for members.

The first paper was by Dr. Henry van der Schalie on "The Relationship of Gravid Periods of Certain Mussels in Michigan on the Pearl Button Industry." Because of the threatened reduction in the supply of good pearl shells the time is coming when synthetic pearl will take the place of the real in the manufacture of buttons. The Michigan industry is limited because so few native mussels are valuable for this purpose and these few are limited in distribution. A permit is required to gather mussels for the industry and a closed season is enforced, but since there are among the mussels both summer and winter breeders they are not fully protected. The summer breeders are gravid from May to July and the winter breeders from fall to April or June. Michigan's most valuable button shells, the mucket and pocket-book, become gravid in August and thus are not protected at present since the law provides an open season during July, August and September. A drastic shortening of the closed season has been suggested or even closing a stream for a period of years. However, in cases of certain mussels with a life span of twelve to fifteen years so short a period of restriction as five years would be of little avail.

There was some discussion on the advantages of clam fishing with hooks rather than forks which disturb the bottom.

Dr. H. E. Wheeler spoke on "The Successors of Timothy Abbott Conrad." Conrad early came under the influence of Thomas Say who was a frequent visitor at his father's house. His own work is well known. Among those who succeeded him in the conchological work of the state were a few outstanding scientists, such as Herbert H. Smith and Truman H. Aldrich. The latter, after a fruitful life of collecting and research, ended his days as curator of the Alabama Museum which now has his large collection of shells. Herbert H. Smith was curator of the Museum from 1908 to 1919. He was born in Manlius, New York, in 1851 and had the privilege of association with Louis Agassiz in his early days. He had keen sight and a good memory and added many new species of land and fresh water shells to the records of Alabama's fauna. So thorough was his work that only two new species have been added since his day. He is remembered affectionately by those who worked with him for the encouragement and inspiration which he gave the younger people in their studies.

Mr. Goodrich recalled that Smith failed to get the *Tulotoma* of Weatherby which had bristles. It must have been extinct before he commenced to collect. Dr. Pilsbry knew Smith and his wife who could tell entertaining incidents of their life in South America. He appeared on the scene just in time to collect the fauna of Alabama rivers before "improvements" destroyed many of the species.

In "Distribution of California Land Shells" Dr. Pilsbry explained the geological reasons for the relationship in the fauna of the Channel Islands with one another and Lower California although distinct from that of the mainland of California. The islands of Santa Catalina, San Clemente, Santa Barbara and San Nicolas form the group known as the Channel Islands and altho all of these possess the same genera of Mollusk the species are distinct. Further south on the mainland at San Diego some of these are coming in. One hundred and fifty miles off Lower California is Guadaloupe where G. D. Hanna found almost all the species to be related to those on Catalina yet again distinct. Thus these three areas separated by a stretch of sea are inhabited by closely related faunas. The speaker pointed out on a map of the region in middle Tertiary time what apparently was the situation of the land areas. A large island then occupied the site of the Channel Islands extending south and including Guadaloupe as a mountain on this Greater Catalina as were also the present Channel Islands. In Pleistocene time great changes occurred and this large island was broken up the mountains remaining above water as islands upon which the fauna became isolated.

Dr. Bartsch congratulated the meeting on having had the opportunity of hearing this valuable paper and said that marine work in the area absolutely confirms Dr. Pilsbry's conclusions.

Dr. Phil L. Marsh spoke on "A Colony of *Helix pomatia* in Jackson, Michigan." In investigating a rumor of the appearance of a strange snail in the southwestern part of Jackson he was led to a residential section of the city where lawns were well kept and backyard gardens a source of pride to the owners. Everywhere in the one block *pomatia* was found on flowers, vegetables, and shrubs, and estivating under buildings, in empty tiles and piles of stones. It had not crossed the street at any point. Five years ago an Italian living in the block released six snails in his garden intending to raise them for food. Conditions here proved more favorable than in other localities in the United States where previous attempts had been made to colonize them. Neighbors were alarmed at the possibility of depredations on their gardens but were assured that this species prefers wilted leaves to fresh ones.

Dr. Archer, who had visited the colony with Dr. Marsh, said that some of the specimens were dwarfish, suggesting *H. rufescens;* others were unusually attractive with violaceous lip. Dr. Wheeler recalled that Greeks living in this country had found *Polygyra andrewsae* very palatable.

Adjourning to the Michigan League at noon, the visitors were the guests of the University of Michigan at a luncheon in memory of Dr. Bryant Walker. This was a much appreciated honor and greatly enjoyed by the thirty-five guests. The dainty paper doilies carrying a sketch of the League Building were utilized as souvenirs being autographed by those present. One of these was prepared especially for Dr. Fred Baker under the supervision of Mrs. Joshua L. Baily Jr. At the conclusion of this pleasant occasion a vote of thanks was tendered the University for their thoughtful courtesy.

On reconvening Wednesday afternoon Mr. Baily opened the meeting under the head of business. The Financial Secretary read the report of the Executive Council which had met on Tuesday morning, with the following recommendations which were unanimously adopted:

That members in arrears for dues for two years shall be dropped.

That the Council shall consist of the officers, honorary and past presidents, and members at large not to exceed four.

That members of the Council present at any annual meeting shall constitute a quorum.

The invitation of Dr. Carlos de la Torre to hold the 1938 meeting in Havana, Cuba, was accepted for the Easter vacation, the week of April 18.

Members of the Council were elected as follows: President, Dr. Carlos de la Torre; Vice-President, Dr. Maxwell Smith; Corresponding Secretary, Mr. Norman W. Lermond; Financial Secretary, Mrs. Harold R. Robertson. Councillors at large, Dr. Henry van der Schalie, Dr. Fred Baker, and Dr. Horace B. Baker. Honorary and Past Presidents, Mrs. Ida S. Oldroyd, Dr. Henry A. Pilsbry, Dr. Paul Bartsch, Prof. Junius Henderson, Mr. William J. Clench, Mr. Calvin Goodrich, and Mr. Joshua L. Baily Jr.

It was moved by Mr. A. La Rocque, seconded by Mr. Calvin Goodrich and unanimously passed: That a standing committee of fifteen or more be appointed by the president of the Union for the purpose of setting up a check-list of the Mollusca of North America north of Mexico.

The committee as appointed consists of Dr. Frank Collins Baker, Dr. Fred Baker, Dr. Paul Bartsch, Dr. Elmer G. Berry, Dr. Stanley T. Brooks, Mr. William J. Clench, Mr. Calvin Goodrich, Dr. G. D. Hanna, Prof. Junius Henderson, Mr. Aurele La Rocque, Mrs. Ida S. Oldroyd, Mr. J. P. Oughton, Dr. Henry A. Pilsbry, and Mr. E. G. Vanatta.

It was moved by Mr. Harold R. Robertson, seconded by Mr. Paul P. McGinty and carried unanimously: That a Committee of Nomenclature be appointed by the president of the Union to consist of five members, and to act in a purely advisory capacity on questions of nomenclature submitted to it. Mr. Baily appointed to this committee Dr. Henry A. Pilsbry, Dr. Paul Bartsch, Mr. William J. Clench, Dr. Horace B. Baker and Dr. S. Stillman Berry.

Greetings were read from Prof. and Mrs. Junius Henderson* and Mr. Norman W. Lermond who also sent an invitation to the Union to meet in Thomaston, Maine, for its ninth annual convention. Mr. J. P. Oughton brought greetings from the Royal Ontario Museum in Toronto and an invitation to come to that city in 1939. These invitations as well as one of long-standing from the San Diego Shell Club were received with gratitude and will be considered at the next meeting.

It was moved by Dr. B. R. Bales, seconded by Mr. Harold R. Robertson and carried unanimously: That Mr. Norman W. Lermond be especially invited to attend each annual meeting of the American Malacological Union and that a check for traveling expenses not to exceed fifty dollars accompany each such invitation; this action being taken in recognition of Mr. Lermond's successful efforts in starting the American Malacological Union.

A vote of thanks, moved by Thomas L. McGinty, was given Dr. de la Torre for his attendance at this meeting at such a distance from his home. Dr. de la Torre in responding expressed his gratitude to the Union for honoring him with the presidency and promised to do all in his power to make the convention in Cuba next year a pleasant one.

In tribute to the memory of members lost by death since the last meeting Dr. Bartsch asked for a moment of silence while the assembled company stood with bowed heads. Those thus remembered were Dr. Bryant Walker, Herbert N. Lowe, Mrs. Clifford L. Blakeslee, Prof. B. Shimek, Miss Theodora Willard and Mrs. Burr H. Nicholls.

At the conclusion of the business session resolutions were adopted thanking the faculty of the Museum of Zoology of the University of Michigan for the use of meeting rooms and other acts of hospitality in connection with the 1937 convention.

Presentation of papers was resumed with "Habitats of Some Land Mollusks in Eastern North America" by Dr. Allan F. Archer. Certain variations dependent on environment result in producing geographical races. Especially is this true in the case of widely-spread species. These, Dr. Archer considers, should not be designated by a third name. Certain species exhibit an increase in obesity from high to low land while other characteristics remain constant, such as the aperture features of *Stenotrema* which are not affected by these changes. A large series of lantern slides was shown to illustrate Stenotremas under varying conditions.

Dr. Bartsch referred to a statement made by the speaker to the effect that not many shells are found in coniferous forests. This, he explained, is due to the acidity of the soil in such situations. Dr. Baker noted that thick humus also is unfavorable for shell life.

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*Prof. and Mrs. Henderson were prevented from attending the meeting because of the serious illness of the former. It is with deep sorrow that we report that Prof. Henderson's death occurred on November 4.

"Fossil Molluscan Fauna of the Ortona Lock Excavation of Florida" was the title of the paper given by W. E. Lincoln, a resumé of studies by Mr. Lincoln and Dr. Pilsbry on the material from this locality which is forty-one miles east of Fort Myers and fifty-six miles from the Gulf. Splendid specimens of this fauna were exhibited in remarkably perfect condition. Southern Florida was described as a wide shallow sea in Tertiary time with little wave action and the fossil beds deposited at that time are nearly horizontal. The Caloosahatchie River cuts into the formation which is near the surface and exposed much of this fine material. Florida came up slowly out of the sea and all the inland was transformed into marshes so that freshwater forms are found intermixed with the older fossils near the surface. It is possible that most of the freshwater material is Pleistocene instead of Pliocene.

There was some discussion by Dr. Bartsch, who spoke particularly of the beauty of the specimens and Dr. Spicer who asked if the optimum of molluscan abundance has passed as one might conclude from the fact that there seem to be so many more fossil species than recent. Dr. Baker thought the time factor may be important in explaining the apparent abundance since one deposit of fossils may have been accumulated over a period of thousands of years.

Dr. Bartsch was the next speaker, his subject being "Is It Environment?" He has been trying to find positive proof that one species has been changed into another by the effects of environment, but so far he has been unable to adduce convincing evidence.

His twenty-five years of Cerion breeding have produced no changes in these organisms due to environment. He has, however, secured an endless number of variants through hybridization, which has established the fact that cross-breeding of unrelated species does not necessarily produce sterile mules for his Cerion hybrids are certainly productive.

Doctors Bartsch and de la Torre in their studies of the Cuban Annulariidae of which they have examined hundreds of races, have found that in the distribution of at least six subgenera of the subfamily Chondropominae, the species and subspecies occupying the Sierra San Andres and the adjacent mogotes, are always dark in color, while subspecies of the same genera and subgenera occupying the territory to the east and west are of much paler coloration. This characteristic appearing in every group of the subfamily Chondropominae represented in this region would indicate that these manifestations are the result of some environmental stimulus, which may be food supply or geologic substrate. (An analysis of the shells shows a trace of manganese present.)

Dr. Bartsch called attention to the fact that an investigation in this subject would make a beautiful doctorate thesis for some student. The paper was illustrated with specimens whose images were projected on a screen by means of a reflectoscope.

The final paper was by Dr. Carlos de la Torre, entitled, "The Distribution of *Liguus*." He exhibited an enormous collection of Cuban *Liguus*, and made a comparison of certain forms present in parts of both Cuba and the Florida Keys, and showed their identicalness in these two regions by projecting their images on a screen. He claimed that there was only one way in which the Florida forms could have reached the Keys from Cuban sources, namely, hurricanes, and he gave a most convincing demonstration for such an origin by exhibiting a chart upon which were plotted the tracks of the recorded hurricanes, which have crossed Cuba and Florida. In each case these covered the distribution of identical forms, those having been derived from the north central coast of Cuba occupying the upper Keys, those occupying the western portion of Cuba being found in the lower Keys.

He likewise showed that the group represented in Haiti has its congeners in southeastern Cuba, and he believes that these also owe their present distribution to the same agencies. Hurricanes move at great speed, and young *Liguus* attached to leaves in the high parts of trees, it seems reasonable to believe, could be carried in this way across the ninety-six miles or more separating the Floridian shores from those of Cuba. He also pointed out that the absence of hurricane tracks from eastern Cuba to the Bahamas is probably responsible for the absence of these shells in that archipelago.

The unrivalled collection that Dr. de la Torre exhibited at the meeting gave *Liguus* lovers an opportunity to see what a marvelously diversified fauna the "Pearl of the Antilles" harbors.

In the evening such members as were present on the Committees of Nomenclature and Check-list, met to organize while other visitors availed themselves of the opportunity to select duplicates from the Walker collection, a much appreciated privilege of obtaining authentically named specimens of land and freshwater species.

Thursday was as perfect as a day could be, and an early start was made by auto for Edwin S. George Reserve, thirty miles from Ann Arbor where the University of Michigan operates a field laboratory in ideal country surroundings. Here are to be found all types of inland conditions, field and woodland, swamp, stream and lake, so that students of land and freshwater species scattered in different directions, each to his liking, while others relaxed in the grateful shade. Cameras were busy, one interesting subject being the eldest and youngest members present, Dr. Carlos de la Torre and Dr. H. E. Wheeler, veteran conchologists, and the latter's protege, William Crosby, aged eleven, just entering the field.

During the afternoon the new Council was called together to consider the question of new memberships during 1937 in view of the generous offer of Dr. de la Torre to secure free transportation for visitors to the eighth annual meeting in Cuba in 1938, from Miami or some other Florida port to Havana and return. To insure against an unwieldy influx of members, it was decided: That applications for membership from Florida, at the discretion of the officers, be acted upon at the next meeting.

At two o'clock luncheon was served on the lawn, dainty sandwiches and crisp salad with iced drinks and coffee, a delicious repast prepared by Mrs. Calvin Goodrich and Mrs. Henry van der Schalie. All too soon the pleasant afternoon passed and with it the conclusion of the convention which will be remembered as one of the bright spots of the summer of 1937.

MEMBERS IN ATTENDANCE AT THE SEVENTH ANNUAL MEETING

DR. ALLAN F. ARCHER, Ann Arbor, Mich.
MR. AND MRS. JOSHUA L. BAILY, JR., San Diego, Cal.
DR. HORACE B. BAKER, Philadelphia, Pa.
DR. AND MRS. B. R. BALES, Circleville, Ohio
DR. PAUL BARTSCH, Washington, D. C.
DR. ELMER G. BERRY, Ann Arbor, Mich.
WILLIAM CROSBY, Highlands, N. C.
DR. AND MRS. G. E. FAIRBAIRN, Ottawa, Can.
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MR. THOMAS L. MCGINTY, Boynton, Fla.
MR. ABELARDO MORENO, Havana, Cuba
MRS. IDA S. OLDROYD, Stanford University, Cal.
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MR. AND MRS. V. D. P. SPICER, Great Lakes, Ill.
DR. CARLOS DE LA TORRE, Havana Cuba
DR. AND MRS. HENRY VAN DER SCHALIE, Ann Arbor, Mich.
DR. AND MRS. H. E. WHEELER, Birmingham, Ala.
EDITH WHEELER, Birmingham, Ala.

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Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. The annual dues are one dollar. There is no initiation fee. For further information address the financial secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, New York.

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University of Havana
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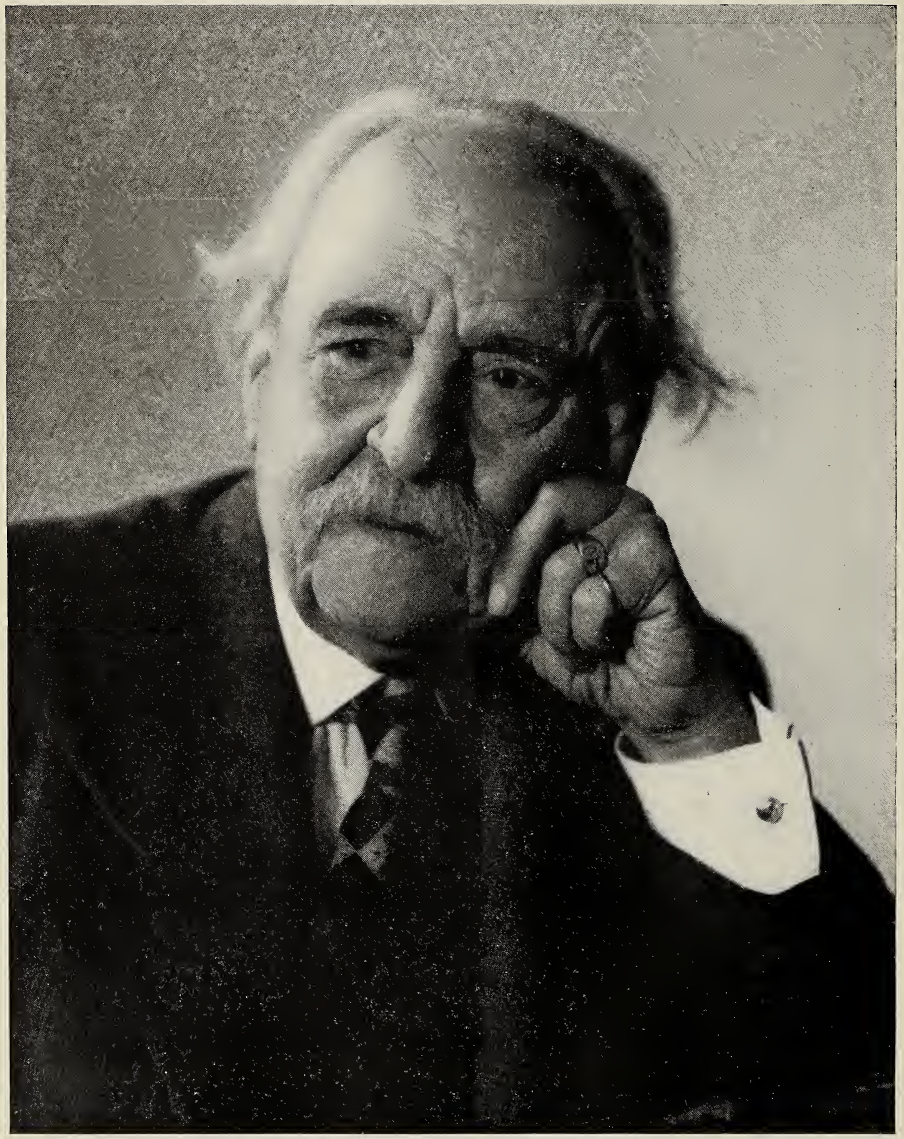

COURTESY OF THE NAUTILUS

DR. CARLOS DE LA TORRE

THE EIGHTH ANNUAL MEETING

OF THE AMERICAN MALACOLOGICAL UNION

HAVANA, CUBA, AUGUST 1 TO 6, 1938

For two years members of the American Malacological Union had looked forward to the eighth annual meeting to be held in Havana, Cuba, in 1938. The invitation had been given by Dr. Carlos de la Torre at the St. Petersburg meeting in 1936 and was accepted with enthusiasm. To those who knew and loved Cuba it was to be a renewal of former joys, and for those who were to visit this "gem of the sea" for the first time, it held promise of unknown adventure and the fulfillment of early dreams. Malacology on this occasion was to receive signal recognition in that members of the Union were to be guests of Dr. de la Torre and the Cuban Government from the moment of leaving the United States until their return.

There were fifty-seven, malacologists and members of their families, who gathered at the Old Island Trading Post in Key West on Sunday, July 31, in readiness for the early morning start for Havana on August 1. They came from far parts of the United States: from Washington, California, Texas, Michigan, New York, Massachusetts, Connecticut, New Jersey, Pennsylvania, Virginia, South Carolina, Alabama, and Florida.

Mr. and Mrs. Wallace B. Kirke, proprietors of the Old Island Trading Post, had made arrangements with a restaurant to serve breakfast at five o'clock Monday morning, and before six all were assembled on the dock ready to embark on the trim cruiser *Cuba* which had been sent by Colonel Gonzalez, Chief of the Cuban Navy, to transport the party to Havana. Clearing formalities at the port delayed the departure of the boat until after seven, but eventually the happy party were heading south over the blue waters of the Gulf Stream. The boat was under the command of Commanders Casanova and Rodriguez Alonso, and officers and crew were ever ready in their services to promote the happiness of their passengers throughout the all-day voyage.

The welcoming committee who greeted the voyagers as they boarded the cruiser, were Dr. Abelardo Moreno, Ernesto Freyre, and Dr. Carlos Alzugaray, representing Dr. de la Torre, and Dr. Rafael Miquel Zayas who represented the Secretary of Education, all of whom contributed much to the pleasure of the trip by their friendly ministrations.

It was late afternoon when Morro Castle was sighted, and soon the city of Havana, beautiful in the tropic sunlight, came into view extending along the waterfront. Dr. de la Torre, with a committee of educators from the University of Havana and the Department of Education, was at the dock to greet the visitors as they landed, his joy in the realization of his dream to hold this meeting in his beautiful homeland, radiating from his beaming countenance. A fleet of taxicabs whirled the party to their headquarters in the Royal Palm Hotel where Mr. P. Moran, proprietor and manager, extended a cordial welcome.

A meeting of the Council was held in the evening and the program for the week was arranged. Reports of the Checklist Committee and the Committee on Nomenclature were presented at this meeting.

The formal sessions of the convention were held in the Academy of Sciences of the University. Dr. de la Torre, President of the Union, opened the meeting at ten o'clock Tuesday morning, giving, as host, an address of welcome in which he reviewed the history of malacology in Cuba. This is a history of one hundred years of achievement since its rays first shone on the island with the publication in 1838 of D'Orbigny's "Mollusks of Cuba." Before the appearance of this work very few Cuban shells were described correctly because they were known to the Europeans who studied them, only as curiosities from some foreign land, definite localities being unknown. *Polymita* was for a long time thought to be an Asiatic genus. Such mistakes are impossible now since the malacologists of Cuba are describing local species themselves. The speaker concluded by expressing the hope that before leaving Cuba it would be possible for visitors to go to the Mountains of Viñales to collect land species and to Varadero for marine shells.

Dr. Paul Bartsch, a past president of the Union, responded, complimenting Dr. de la Torre on his inexhaustible mine of knowledge, not only of the history of science in Cuba, but especially of its molluscan fauna. He referred affectionately to Dr. de la Torre as the companion of many a field trip and to the lasting friendship which has resulted from this intimate association. "I love Don Carlos," were his concluding words.

Dr. Bartsch was the first speaker on the program of scientific papers, his topic being, "The Cuban Operculate Land Shells of the Subfamily Chondropominae." This was a summary of the recent publication by the United States National Museum on this subject by Dr. de la Torre and Dr. Bartsch. The monograph covers those Annularids which have a simple chondroid operculum usually with a more or less granular calcareous deposit on the outside. Eight genera are here recognized, with twenty-two subgenera and one hundred and two species represented by three hundred and twenty-one subspecies. Seven of the genera are confined to Cuba, only one, *Chondropoma,* having representatives elsewhere. By far the greater part of this assemblage is restricted to the western part of the island.

A chart showing the distribution of the various species was displayed, also the original photographs used in illustrating the monograph which is in Volume 85, 1938, of the Proceedings of the United States National Museum.

The next paper was also by Dr. Bartsch, "The West Indian Operculate Land Shells of the Subfamily Chondropominae, Exclusive of Cuba," being a summary of a monograph recently completed on the remainder of the West Indian Chondropominae. This work was made desirable by the completion of the monograph on the Cuban forms of the subfamily. Only *Chondropoma* is found beyond Cuba, and there are no additional genera outside this island, although eight subgenera of *Chondropoma* are added to the six listed for Cuba, over the islands from Hispaniola to Jamaica and the Bahamas.

Dr. Henry A. Pilsbry commented on the value of these papers expressing the conviction that malacologists everywhere will congratulate the authors on the completion of the first part of this monograph. Until the work of Dr. de la Torre and Dr. Bartsch was begun no one had applied the modern methods to the study. Previously all that was available was the compilation by Pfeiffer of work done by early students.

"The Taxonomic Value of the Radula" by Dr. Joshua L. Baily, Jr., stressed the necessity of a study of the radula in specific instances of genera of Littorinidae and Assiminiidae, in which the shell characters are not sufficiently distinct for separation. The study under consideration had been made on the radula of *Algamorda* (formerly *Paludinella*) *newcombiana*, which Dall had removed from the Assiminiidae to the Littorinidae without having found time to publish his reasons for so doing. A careful comparison of the radulae of *Algamorda* and *Littorina* indicates the fairly close relationship between them and entirely justifies Dall in his decision.

Drawings of the radulae in question were shown illustrating this fact. Dr. Baily wishes to make further studies and comparisons before publishing definite conclusions.

"The origin of the Land and Freshwater Mollusks of the Bahamas," by William J. Clench, was a resumé of a paper recently published in the Bulletin of the Museum of Comparative Zoology No. 80. The Bahamas form an archipelago seven hundred miles long by four hundred miles wide, the islands having been completely isolated from any other land mass previous to the arrival of its present fauna. The origin of this fauna therefore, is considered to have been mechanical; hurricanes, drifting debris, or other mechanical means being most likely methods. The reasons for these conclusions are based on the unrelated elements of the fauna and the erratic distribution of the species, an astonishing number of local forms being found throughout the islands.

In discussing the paper, Dr. Bartsch called attention to the agency of man as a means of recent distribution of mollusks, as well as birds which carry little mollusks on their feet in the mud from ponds where they have stopped to feed.

Dr. de la Torre referred to his own paper of last year on the relationship between the *Liguus* of Cuba and Florida which showed that the ancestors of the Florida species came from Western Cuba. The relationships are easily traced in shell markings and can be shown to have a direct connection with the course of hurricanes characteristic of this region.

"Classification of the Polygyridae," by Dr. Pilsbry, sketched the history of the study of this family which comprises the larger Helices of eastern North America. The genus was first described by Say in 1818. In 1878 Binney recognized five genera of the group later called Polygyrinae, a subfamily of Helicidae. These were *Polygyrella, Polygyra, Stenotrema, Triodopsis* and *Mesodon*. Dr. Pilsbry later reduced the last four, to the one genus *Polygyra*. When he came to dissect a large series, however, he discovered that they represented a sufficiently distinct group to justify removing them from the Helicidae and erecting the family Polygyridae to designate this group. *Polygyrella,* which had been tentatively classed with the Polygyridae, was later removed from this family.

At the conclusion of the morning session members were driven to the office of the Secretary of Education, Dr. Fernando Sirgo, to whom they were presented by Dr. de la Torre. Dr. Bartsch supplemented Dr. de la Torre's remarks, paying tribute to the leaders in science which Cuba has produced and expressing the appreciation of the Union for the great honor extended to them by government officials of the country. Dr. Sirgo in responding voiced the hope that the work of the organization might be continued for its own glory and the glory of science and assured his hearers that they were welcome always.

Resuming the program in the afternoon, the first paper was by Walter J. Eyerdam on, "A Collection of Freshwater Shells from Kamchatka," read by Dr. Bartsch. The collection referred to was made by Mr. Eyerdam during the summers of 1925 and 1928 and comprises a total of fifteen species, about half the number reported from this region by Baron von Rosen as the result of collecting done in 1908-1909. There also have been found about fifteen land species on the peninsula. Conditions here are unfavorable to molluscan life which accounts for the small number of species which exist here. The winters are long and cold and the summers are short and hot. Deep snow persists right down to the sea until May. Sometimes drifts of snow cover certain valleys until July, and often there are violent eruptions in this land of over one hundred volcanoes, that destroy all vegetation within the area of hundreds of square kilometers.

Mrs. William P. Hume read a short paper on "Shellcraft," telling of the work of school children in Charleston, South Carolina, in devising articles constructed of shells. While this work is artistic rather than scientific, Mrs. Hume has found that the shells stimulate the children to ask questions relating to their occurrence and habits and therefore there is an educational value to the work. Examples of the objects made by these children who range in age from seven to twelve years, were shown.

Dr. Raul P. Guitart corroborated Mrs. Hume's conclusions by an account of shell work being done by school children at Sancti Spiritus. Here they are making a similar type of objects; boxes, birds, etc. In the Province of Santa Clara six schools are engaged in teaching this type of manual training, as also the school at Guines.

"Some New England Nudibranchs" was the title of two reels of film made by Henry D. Russell and shown by William J. Clench who presented a description of the methods used in the very difficult task of photography. The nudibranchs shown were cold forms and were photographed in a basin of shallow water. The first attempts were unsuccessful because the heat generated by the high power light required, was so great that it caused them to curl up and contract. Success was achieved eventually when a quantity of sea water was frozen and bits of the ice added to the water in the basin to keep it at the necessary low temperature. The film as shown was a splendid record of the color and movements of these beautiful creatures, as well as giving an insight into some of their life histories.

Dr. Bartsch complimented Mr. Russell's success in photographing these colorful "butterflies of the sea" as he called them, regretting Mr. Russell's inability to be present to receive in person, the thanks of the members. Dr. de la Torre also paid tribute to Mr. Russell's skill and charged Mr. Clench with the task of conveying to him the gratitude of the Union for sending these films to the meeting.

Dr. Moreno was the next speaker, his subject being, "The Evolution of the Cuban Liver Fluke and Its Intermediate Hosts." Dr. Perez Vigueras, professor of veterinary medicine, and a foremost parasitologist, collaborated with Dr. Moreno in the production of a moving picture showing the life history of *Distoma hepatica,* commencing with the emergence of the miracidium from the egg. The minute ciliated larva finds its way into a mollusk, *Physa cubensis* or *Lymnaea* (*Nasonia*) *cubensis* where it undergoes the successive changes to the cercaria which may then leave the snail to seek its primary host in cattle, sheep or even man; or it may enter this primary host even more directly if the snail is eaten before its emergence. If the cercaria does not find a host within a short time it may encyst on aquatic vegetation along the banks of the pond or stream, in which case it may enter the host when the plant is eaten. It is then set free by the digestion of the encysting tissue and migrates to the liver or some other organ of the unfortunate victim of the infestation, there to reach maturity and produce eggs which are discharged in the faeces and require only the accident of a water environment to hatch. The film shown by Dr. Moreno gave an unusually complete picture of this cycle.

Dr. Bartsch was enthusiastic in praise of the film, saying that we have nothing to equal it in the States so far as he knew. Cuba, through these two scientists, has set a pace which the United States well may follow. Such a film should be of great aid in educating the farmers of Cuba and so enlisting their intelligent help to eradicate this parasite which causes an annual loss to the country by the infection of cattle alone, of twenty million dollars. This is the first time that *Physa* has been implicated in the vicious circle.

Mr. H. E. Wheeler next gave a sketch of the life of William Henry Doherty in his paper entitled, "An Almost Forgotten American Conchologist." Mr. Wheeler's interest in this early collector was intrigued by the fact that there were so many suites of shells collected by Doherty in his own cabinet and in that of the late Truman H. Aldrich, and also by the statement made by the president of the London Zoological Society, that William Doherty and Herbert H. Smith were the greatest field collectors of all time.

William Doherty was born in Cincinnati, Ohio, in 1857, and died in Nairobe, British East Africa, in 1901. Before he completed his college work, being matriculated at Yale, he was an attache of the Smithsonian Institution and commissioned to Paris to install the exhibits in the Exposition of 1878. Immediately after this Exposition he started on his travels, first through Europe and later to the ends of the earth, becoming an ardent collector and a proficient linguist. From 1880 he was the most omnivorous and indefatigable field collector known to the Museum world, and his interest covered the whole range of zoology, insects, shells, fishes, and birds commanding the larger share of his time. It is to be regretted that he never wrote a detailed account of his travels, although his letters to his mother during these wanderings contain much material that would be of value to the scientific world. Mr. Wheeler hopes to write a biography of Mr. Doherty, but to accomplish such a work satisfactorily, it is almost necessary to obtain access to these letters which are jealously guarded by an aged sister now residing in Connecticut.

Dr. Paul S. Galtsoff had been asked by Dr. de la Torre to present a paper on some practical phase of malacology. "Physiology of Reproduction in *Ostraea virginica*," was Dr. Galtsoff's response in which he presented reasons why oyster culture could be made a profitable industry in Cuba. The sexes in oysters are separate, normally in almost equal numbers. The ovary in the female oyster is a huge mass under the mantle whence a tiny opening brings the eggs into the cloaca. They are not, however, carried out immediately as might be expected, but accumulate in great numbers and are not discharged until stimulated by the presence of sperm when the entire number are ejected. In the male oyster the sperm is discharged into the cloaca and carried away at once. An understanding of the factors which stimulate spawning will enable the oyster grower to regulate his beds to a certain extent in this regard. In nature when the oysters are ripe and temperature conditions favorable, it is always the male which begins spawning. If the female is ripe it responds to the stimulus and discharges the eggs which in turn stimulate other males to spawn and so the spawning spreads throughout the bed. If spawning can be regulated so that it may be done at one time, then in two weeks the beds will be set with young spat. They may be cultivated with no guess work. The results of experiments in the study of sex reversal were also given.

Dr. Bartsch asked Dr. Galtsoff to give a summary of the work of oyster culture in the States. In response Dr. Galtsoff said that cultivated oysters sell for two and a half to three dollars a bushel while wild oysters bring only twenty-five to thirty cents. The United States Bureau of Fisheries issues weekly, sometimes daily bulletins for the information of the oystermen. These relate to weather forecasts, spawning observations and other matters of value to the grower. The starfish is one of the most destructive of oyster enemies, causing a loss annually of six hundred thousand dollars, as well as a loss sometimes as high as two hundred thousand dollars to scallops. The use of quicklime in combatting it is being developed. It kills the starfish in five or six days and the precipitate does not change the chemistry of the water. *Urosalpinx* is another drepadator. Ingenious traps are used in collecting them from the oyster beds.

The first paper on Wednesday morning was by Dr. Ricardo de la Torre on "Causes of Color Changes in *Liguus*." The color of the shells of this genus is highly variable and may be divided into two groups according as it occurs in the periostracum or the shell itself. The periostracal coloration is reduced to green longitudino-spiral lines which are not subject to variation with age nor in cases of melanism, xanthism, or albinism so frequent in *Liguus*. Each of these lines ends in a notch in the outer lip of the shell which is crenulated, a character which is produced with or without the existence of other lines or colors.

The other types of coloration belong properly to the shell, not to the periostracum, and form more or less continuous longitudino-spiral lines and bands (never green) and alternately dark and light, complete or incomplete, flame shaped, transversal bands that may coexist with or not with the other. The first and second whorls are uniformly colored, white, pink, or brown; in the third, fourth and fifth the bands are well defined, perhaps becoming cloudy in the sixth and seventh and disappearing totally or partially in the last portion of the seventh with the sole exception of the green periostracal lines. The first appearance of the variously colored bands seems to coincide with the period of sexual maturity and their disappearance occurs with the advent of old age. Dr. de la Torre thus considers them due to sexual hormones.

Mr. Clench expressed the hope that Dr. de la Torre will extend his studies to other groups such as *Polymita,* and see whether this interesting theory can be substantiated. Dr. de la Torre answered that he would leave work on *Polymita* to his uncle, Don Carlos, the king of Polymitas.

Dr. Pilsbry remarked that the patterns in shells do to some extent, follow underlying structure, the supraperipheral band for instance, being just above the pulmonary vein.

"The Genus *Semicassis* in the West Indies," by Dr. Harald A. Rehder, dealt with the geographic variations of *Semicassis inflata.* This form has three rather close relatives, *sulcosa* in the Mediterranean, *centiquadrata* (formerly *abbreviata*) from the West Coast, and the typical *granulata* Born, from the Carribbean. There is no valid differentiating mark between the species from the east and west coasts of Florida. *S. granulata inflata* is large and inflated, with irregular sculpture, low ridges and broad shoulder, the characteristic form in the Caribbean Basin from southern Jamaica, St. Croix, Venezuela and Columbia; *recurvirostrum* is a smooth form found in the general chain of the Antilles from Cuba to Trinidad. A small form, strongly sculptured, with varices, has no definite range but may be found scattered here and there throughout the West Indies and Florida and is probably an environmental response.

Dr. Bartsch called attention to the difficulties in such a study as that presented, because of the many problems encountered. Old collections are faulty as reference material because specimens from this region formerly were labeled simply "West Indies" without definite location. In stressing the necessity of recording exact locations Dr. Bartsch spoke of the collection at the National Museum which, he said, belongs to the nation. Everything which can be added to it will help to make it more valuable in its service to students. He urged collectors to send specimens and data to this repository.

Mrs. E. M. Van Woert exhibited a mollusk trap devised by Frank B. Lyman of Lantana and used by him with great success in water from ten to one hundred fathoms deep.

"On Descriptions of Mollusks" by Dr. Carlos Guillermo Aguayo was a protest against the too frequent practice of publishing descriptions of new species without accompanying figures. Having been unable to identify several species which he had collected in the northern end of Cuba two years ago, because original descriptions of many species from the same region had not been figured, Dr. Aguayo proposed that members of the Union agree not to describe species without figures and that we write to all institutions asking them to do likewise. Dr. Aguayo further proposed a resolution recommending to the International Commission on Nomenclature that no description of a mollusk will be considered valid without figures and descriptive data as well as specific locality. Also that the Editor of the *Nautilus* be asked never to admit anything not so described. This resolution was seconded by Dr. Ricardo de la Torre and approved.

Mr. Fred G. Orsinger, head of the National Aquarium in Washington, spoke on the topic, "Why a Cuban Aquarium Should Excel All Others." Mr. Orsinger enumerated the various natural advantages possessed by Cuba which would make the maintenance of a marine aquarium more efficient and less costly than in any other place in the world. All that would be required to maintain such an aquarium is a pump to take water from the Gulf Stream without change of temperature. Pure water in unlimited quantities is at the very door, a situation existing almost nowhere else in the world and one which should be taken advantage of in an aquarium which, the speaker suggested, should be a monument to Dr. de la Torre. The Shedd Aquarium in Chicago brought a million gallons of sea water from the Florida Keys. Six hundred gallons a day are lost by evaporation necessitating a constant replacement which is costly. San Francisco must go twenty miles out into the ocean for pure water, and New York, thirty miles to get beyond the pollution line. The famous Aquarium at Naples is suffering because the water of the Bay of Naples is so contaminated that it is no longer available for aquarium purposes.

Dr. Galtsoff seconded all that Mr. Orsinger had said, adding that Cuba is so situated that an aquarium here could become the greatest and most famous in the world if carefully planned from the beginning.

Dr. Bartsch said that nine-tenths of the money used in maintaining the Shedd Aquarium goes for purifying the water, and likened the difference in the probable cost of existing aquaria and the one which Cuba might build to that between a sixteen-jewel watch and a sundial.

"Conchology versus Malacology in the Family Amnicolidae" was presented by Dr. Elmer G. Berry. The Amnicolidae has been a rather difficult family to correctly classify, chiefly because most of the species have the same general shape and are often without definite characters. Sometimes two sfpecies belonging to separate subfamilies have shells resembling each other so closely that they cannot be separated generically by their shell characters, (*Lyogyrus pupoideus* and *Amnicola walkeri*). Again the range of variation in a single species might be so great that the extremes have been given specific names whereas the radula, genitalia, and other anatomical characters reveal a single species (*Amnicola emarginata*). With the use of lantern slides these statements were demonstrated. Seven species of Amnicolidae which are frequently confused with each other were discussed by comparison of their shells, radulae and soft parts. While the shells might be easily confused, the radulae and genitalia in each species are distinct and form the only reliable characters for correct identification. Other genera which, because of the similarity of the shells, have previously been included under the family Amnicolidae, have later been assigned to separate families because of the character of the radula and soft part (*Pomatiopsis*).

Dr. Berry concludes therefore, that in the family Amnicolidae the shell is the least reliable character that can be used in correctly classifying the species. Malacological characters are not only distinct for each species but are constant reliable characters and in certain groups, must be employed for correct determination.

In reply to Dr. Pilsbry who asked for Dr. Berry's method of narcotizing in order to get the fine photographs shown, Dr. Berry said that menthol crystals relax the animals in good shape, fourteen or fifteen hours, however, being required to completely anaesthetize them.

"Faunal Relations Between the Naiades of the Cahaba and Tennessee River Drainages," by Dr. Henry van der Schalie, was read by Dr. Berry. Data based on a comparison of the shells of Naiades inhabiting both drainages, were adduced to prove that there formerly were connections between the Tennessee and Alabama systems and that such connections must have existed at two different times geologically. The one must have been between the tributaries of these river systems and was recent because changes are evident in the *creek* species which have crossed into the Alabama from the Tennessee; the other must have taken place at a more remote time and was a connection between streams of larger size than creeks because the forms entering the Alabama from the Tennessee are the larger stream forms and have become definitely modified in the Alabama drainage.

Geologists following D. W. Johnson do not believe that such a connection ever existed, but the biological evidence afforded by this study seems to support the contrary view.

Dr. Pilsbry expressed pleasure at hearing the evidence presented remarking that since embryos of Naiades are carried by fish it is only necessary to have a stream piracy of one creek to effect the transfer of the fauna of one river to another.

Dr. Pilsbry was the first speaker in the afternoon, his subject being "Structure of the Radula." This characteristic molluscan organ is like a long strap covered with teeth and coiled like a watch-spring. The teeth are arranged in numerous transverse rows along the length of the strap which works on a strong cartilage. In the Taenioglossa the teeth are folded together, the outer ones overlapping the inner. As soon as the radula is brought into operation they spread out and are used as a fine rake, combing the surface of the object or material to be devoured. This action is characteristic of gastropods and may be well seen in watching a snail in an aquarium with a hand-glass. *Viviparus* is large enough to show the process distinctly.

"The Distribution of Land Mollusks of Alabama from Their Probable Source of Origin," by Dr. Allan F. Archer, was read by Dr. Wheeler. A lantern slide of a map of Alabama was shown in illustration, on which were outlined portions of six physiographic provinces rather than only five as recognized by Fenneman and Johnson, for the state. These six are: Coastal Plain; Piedmont Highlands; Blue Ridge Province; Appalachian Valley; Cumberland Plateau; Highland Rim. The Highland Rim is merely a special area of Fenneman's Interior Low Plateau, and the Cumberland Plateau is only a southern division of the Appalachian Plateau.

The Gulf Coastal Plain has been the avenue for the migration of special elements. The prairie and cedar glade fauna contains elements that probably had their origin in the Mexican Highlands. The Mississippi Valley elements present a special complex, and are more closely related to the fauna of the Interior Lowlands of the Midwest than to that of the eastern Gulf Coast. The region of North Florida is a special area of endemics whose remote ancestors were probably derived from the Texan-Mexican complex. This study is of special interest because the Coastal Plain is a recent land area whose fauna is mostly derived from the old land areas in spite of the endemism which has occurred in north Florida.

The concluding paper was by Dr. Moreno on "Anatomic Studies of *Polymita.*" In introducing the speaker, Dr. de la Torre said that for many years it was not known exactly which was the *Helix picta* of Born. He himself has named many varieties and it became a matter of interest to him to know whether there was a difference in the animals of these various forms. It therefore became necessary to make careful studies of their anatomy, and Dr. Moreno was selected to do this work. In preparation for his studies he spent several weeks in Philadelphia last year learning at the Academy of Natural Sciences how to make the careful dissections necessary for the microscopical preparations employed in the research. Many series of beautiful drawings of these preparations were exhibited and the relationships and specific differences indicated. These studies and plates will be published and will be found of value far beyond the limits of Cuba.

Dr. Bartsch, in commenting on the valuable work which Dr. Moreno has done, said that no greater happiness can come to an educator than to see his students carrying to farther fields the spirit of investigation kindled under his own inspiration, as in this case.

Capt. W. A. Read also spoke in appreciation of this splendid achievement, acknowledging the profound debt of gratitude we all owe to Dr. de la Torre who may well be proud of the fact that he has educated so many to carry on the work of malacology.

Dr. de la Torre, in responding to these felicitations, lauded the work of his pupil and assistant as did also Dr. Aguayo, another of Dr. Moreno's teachers.

At the close of the program of papers Dr. de la Torre exhibited ten colored plates of *Polymita* illustrating his monograph. The plates will be painted by hand for one dollar each, thus bringing the price of the plates to ten dollars for each volume. Members were offered this magnificent work for the cost of the plates alone and orders were taken from those in attendance.

A short business session was held at which officers were elected as follows: Maxwell Smith, President; Horace B. Baker, Vice-President; Norman W. Lermond, Corresponding Secretary; Imogene C. Robertson, Financial Secretary.

Councillors at large: Henry van der Schalie and Myra Keen.

Honorary and Past Presidents are: Ida S. Oldroyd, Henry A. Pilsbry, Paul Partsch, William J. Clench, Calvin Goodrich, Joshua L. Baily, Jr., Carlos de la Torre.

Henry D. Russell, Harold Heath and Frank M. McFarland were added to the Checklist Committee and Harald A. Rehder to the Committee on Nomenclature.

The question of raising the annual dues to two dollars in order to contribute to the cost of increasing the size of the *Nautilus* and so provide more space for publication of malacological material, was ordered put to a vote of the entire membership. (A coupon for your vote will be found on the back cover of this Report.)

An invitation from the Royal Ontario Museum of Zoology in Toronto, Ontario, to hold the ninth annual meeting in the Museum, was accepted with gratitude, the dates later fixed by the local committee being June 20 to 23, 1939.*

Dr. Pilsbry spoke of the losses we have sustained during the year in the deaths of Prof. Junius Henderson and Dr. Fred Baker, both of whom were members of the Council. Dr. Pilsbry and Dr. Bartsch both paid tribute to Prof. Henderson's valuable work on the mollusca of Colorado and the West; as well as to his contributions to geology, and in other fields of science including mammalogy, ornithology, and anthropology. His was a disposition of unusual friendliness and he will be remembered by all who knew him for his kind helpfulness. The sympathy of the members is extended to Mrs. Henderson.

Tribute was paid also to Dr. Fred Baker. Dr. Bartsch and Dr. Phil Spicer spoke at length of his activities and his collecting in many parts of the world and of the qualities which made him a cherished friend and neighbor. Resolutions of sympathy were passed for his children.

A moment of silence in memory of these departed members concluded the meeting.

The program which had been arranged for Thursday included a trip to the mountains of Viñales in Pinar del Rio, preceded by a visit to the Civic Military Institute at Ceiba del Agua. Transportation was by bus from the Royal Palm Hotel, the start being made by nine o'clock.

Ceiba del Agua is so named because of the ancient ceiba tree which marks the site of the town. At its base is a cavity where is a natural spring of water supplying the constant moisture which contributes to the luxuriant growth of this magnificent "silk-cotton." Around this symbol of life Colonel Fulgencio Batista elected to build his first Instituto Civico Militar for the care and education of orphans of Cuba. This monumental work was begun only two years ago and at the time of this visit had been functioning actively for six months.

Assembled in the beautiful auditorium, the visitors were welcomed by Dr. A. Sosa who outlined the ideals and work of this University of Life where orphans of men who have given their lives in the service of their country are cared for and educated to become useful citizens. Colonel Batista and his coworkers intend to establish one of these institutions in each of the other provinces of Cuba.

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*The local committee for the ninth annual meeting consists of Dr. J. R. Dymond, Royal Ontario Museum of Zoology, Toronto, Ont., Chairman; John P. Oughton, Royal Ontario Museum of Zoology, Toronto; Dr. George E. Fairbairn, Aurele LaRocque and L. S. Russell, National Museum, Ottawa, Canada.

Dr. Bartsch responded for the Union, saying that we of the United States are deeply interested in the advancement of Cuba and are pleased to note that here she is taking the lead in an institution where mind and body are trained at the same time. Congratulations were extended on blazing the trail and on the humanitarian work projected.

A tour of inspection of the shops and grounds was made under the guidance of officers and teachers. The shops cover a variety of industrial occupations where the pupils are taught trades to help them in after life, as well as providing materials needed in the operation of the school. These include among others, a bakery, shoe shop, print shop, laundry, and foundry, all equipped with the most modern machinery. The class rooms are cheerful and well-appointed, from the kindergarten with its delightful wall decorations and educational toys to the scientific laboratories with microscopes and other special equipment.

To the visitors the Museo Carlos de la Torre presented the great attraction of a collection of some of Dr. de la Torre's choice specimens of *Polymita* and *Liguus*.

An exhibition of athletic and military drills was given, a splendid demonstration of efficient training and of the response of the pupils who, in the short space of six months, were able to execute these maneuvers with such precision. Music was furnished by the school band.

A bountiful luncheon was served in the spacious dining hall, at the close of which Mr. Wheeler thanked the officials for this memorable occasion. Twenty-six years ago he had been the guest of Dr. de la Torre and had then seen the schools and colleges of Cuba. Beautiful as they then were, he found them more beautiful than ever now. Especially is this splendid school to be commended for the opportunities which it provides for the less fortunate children of the country. Cuba may look forward with confidence to a brilliant future when these boys and girls, cared for by the Cuban Government, take their places in the Cuba which is to be.

It was well into the afternoon when the start was made from the Institute for the ride of nearly eighty miles to Pinar del Rio where, in the mountains of Viñales, *Liguus* flourishes and other forms peculiar to western Cuba, thrive. The drive afforded an opportunity to view the countryside with palms silhouetted against the horizon and the distant range of the Organ Mountains. At Guanajay a stop was made which permitted the taking of photographs of this typical Cuban town with its imposing public square and quaint church. Other stops along the way were taken advantage of for collecting in the roadside ditches. When Candelaria was reached it became evident that it would be too late to do any collecting after reaching Viñales, and it was decided to return to Sierra Anafe. Here some time was spent in the woods surrounding Pena Blanca where species of *Zachrysia, Chondropoma,* and *Liguus* were found among other characteristic Cuban forms. It was with difficulty that the more avid collectors were induced to leave this enchanting spot, but finally the buses were given the signal for the return to Havana which was reached before sundown.

Friday morning was left free for the visitors, giving a much desired opportunity for viewing Havana with its magnificent public and historical buildings among which the splendid capitol and the Columbus Cathedral were of special interest.

At five o'clock came a visit to the University of Havana and a reception by the Vice Rector and Acting President, Dr. R. Mendez Penate. Dr. de la Torre presented the guests, speaking of his great joy in thus bringing them to his alma mater. Dr. Penate, in his address of welcome expressed his pleasure in receiving this visit from so many of the scientists of the United States for whom Cuba has the greatest respect and admiration. A tour of the University buildings with their splendid class rooms and laboratories, the magnificent library and the Museo Poey where Don Carlos spends his days surrounded with his corps of students and assistants, brought to a close the formal entertainment program.

There remained, however, one last act of hospitality to climax this week in Havana, the farewell banquet at the Royal Palm Hotel given by Mr. Moran. This was served on the roof of the hotel in the "Steamship Royal Palm" as this part of the building is called. After a sumptuous repast of delectable Cuban dishes, Dr. de la Torre presented to each of his departing guests a large autographed photograph of himself, explaining that in this way he would go with them, from whom he was so loath to part. This touching mark of affection by the retiring president called forth an expression of gratitude from Dr. Bartsch for this carbon likeness of one whose image is painted indelibly on each heart in the glowing colors which affection employs.

The little poem written by William P. Hume and dedicated by Mrs. Hume to Don Carlos on this occasion, beautifully describes this photograph:

"I love the little laugh lines in your face;
The tiny twisted etchings near your eyes;
Dear ghosts of all the happy thoughts and smiles
You gave to others with your laughing grace.
I love the way that time has deftly sketched
So many kindly deeds of hand and heart,
And gently, with a cunning tool has etched
A lovely pattern with a master's art.
I love the little laugh lines in your face;
The lovely pattern of your hand and heart."

Dr. Bartsch next presented to Dr. de la Torre a testimonial of gratitude bearing the signatures of all present and bound in a cover of exquisitely tooled leather. It was inscribed:

"To Don Carlos:

We are grateful to the sea
    For it gave us the Pearl of the Antilles.
We are grateful to Cuba
    For its gift of Don Carlos
Whose teachings have made known
    The life of land and sea;
But above all,
    What friendships should be."

The following resolutions were passed:

At the conclusion of this Eighth Annual Convention in Havana, Cuba, the members of the American Malacological Union wish gratefully to express their appreciation for the magnificent hospitality which has been extended to them throughout their stay, by the Government and scientific bodies of Cuba.

Nothing was left undone which could contribute to the pleasure and success of the convention, making it notable in the history of our organization.

Our thanks are especially due to the Honorable Laredo Bru, President of the Republic; to Colonel Batista, Chief of the Army; to Colonel Gonzalez, Chief of the Navy; to Dr. Fernando Sirgo, Secretary of Education; to Dr. R. Mendez Penate, Vice Rector of the University of Havana; to Commander Casanova and Commander Rodriguez Alonso, of the Cruiser *Cuba;* to Mr. P. Moran, manager of the Royal Palm Hotel; to the press of Havana; and last, but not least, to our beloved president, Dr. Carlos de la Torre, and his able aide, Dr. Abelardo Moreno, who have been tireless in securing the comfort and happiness of their guests.

May we also venture to express the hope that the governing authorities of Cuba may realize the value to science and education of an aquarium and marine biological laboratory which can utilize the unique opportunities available in the environs of Havana.

A special resolution of thanks was passed for Dr. Abelardo Moreno who displayed unfailing good nature and almost superhuman endurance in being present on all occasions for the guidance of the group.

Dancing followed the supper, and after the dancing, a few hours of sleep before the departure in the morning. An early breakfast, a last drive along the Malecon to the dock, farewell to Don Carlos and the few fortunate members who were to remain for another week, and the *Cuba's* officers and crew once more welcomed the American malacologists, this time for the homeward trip. Dr. Moreno, Dr. Ricardo de la Torre and Mr. Emerito Vigil accompanied them to Key West which was reached at five o'clock. Final farewells to these faithful and attentive hosts, then the dispersal to the four corners of the land, and the memorable Eighth Annual Meeting had passed into history.

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Yes...........

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This Report is printed in uniform size with the Nautilus *and may be bound with it if desired.*

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Ninth Annual Meeting
Royal Ontario Museum
of Zoology
Toronto, Ontario
June 20--23, 1939

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THE NINTH ANNUAL MEETING of THE AMERICAN MALACOLOGICAL UNION

Tuesday through Friday, June 20 to 23, 1939

For the second time in its history the American Malacological Union this year held its annual meeting outside of the United States though still in the Americas. Cuba was the scene of the first of these foreign meetings in 1938, and Canada was the scene of the second.

On Tuesday, June 20, 1939, the Ninth Annual Meeting was convened in Toronto, Ontario, in the Royal Ontario Museum of Zoology. At two o'clock in the afternoon Mr. Maxwell Smith, President of the Union, formally opened the meeting and introduced Dr. J. B. O'Brian, Chairman of the Board of Trustees of the Museum, who welcomed the fifty-three members in an address which expressed the cordial feelings existing between Canada and the United States.

Mr. Smith responded for the Union saying that the welcome extended was deeply appreciated and that the program arranged by the local committee was anticipated with the greatest pleasure. Such meetings strengthen the bonds between our two countries and give a new extension to our horizons.

Professor J. R. Dymond, Director of the Museum of Zoology, then spoke briefly on "An Outline of the Organization of the Royal Ontario Museum." After welcoming the visitors to the Museum of Zoology, the speaker said that the Museum building houses five museums, each having its own Director and staff. These are the Museums of Geology, Paleontology, Mineralogy, Zoology, and Archeology. Those devoted to the natural sciences are referred to in the inscription on one side of the entrance, "The Works of Nature through Countless Ages," while archeology is indicated in the inscription on the other side, "The works of Man through all the Years." John G. Oughton, a member of the local committee of arrangements, the speaker said, is in charge of the mollusks in the Museum of Zoology, the only professional conchologist at present in Canada. Professor Dymond took this occasion to say that Mrs. Oughton, as secretary of the Museum of Zoology, had done untiring service for the committee of arrangements.

The first of the scientific papers was by Dr. Paul Bartsch who presented "A Synopsis of the Cuban Operculate Mollusks of the Family Annulariidae." This was a resumé of the work done by Dr. Carlos de la Torre and himself during the past year on the family Annulariidae. The speaker pointed out that the manuscript for the entire family is now complete and the parts covering the subfamilies Rhytidopominae, Adamsiellinae, and Annulariinae, will very shortly be submitted to the United States National Museum for publication.

He gave a short account of the features that characterize the family and the subfamilies and then called attention to the marvelous diversity in the development of the operculum used in this classification. By means of the remarkable breathing devices which are present the organisms are able to close their doors to undesirable visitors and still breathe. These breathing devices are not characteristic of any particular group but occur to some extent in all of them. They may consist of a mere notch on the parietal wall near the posterior angle of the aperture, or a puncture a little within the edge of the peristome in the same location. The puncture may be reënforced with a siphon on the outside and this may open freely at the suture or it may be bent behind the suture and extend into the umbilicus, which it may plug, breathing being then established through the hollow axis and the decollated apex.

In one group there is a slit in the columella which opens into the hollow axis and the animal is directly able to communicate with the outside. These are marvelous adaptations, useful in breaking up the immense family into subgroups.

Last year these authors published a report on "The Cuban Operculate Land Shells of the subfamily Chondropominae," (Proceedings of the U. S. National Museum, vol. 85, pp. 193-423, figs. 71-101, pls. 7-39), in which 102 species represented by 321 subspecies were discussed.

The present report shows four subfamilies in the Island of Cuba with a total of 22 genera, 71 subgenera, 320 species, represented by 648 subspecies. This most remarkable fauna is larger than that known from any other part of the world. The paper was illustrated by three large charts which presented the distributional features of the subfamilies, genera, and subgenera.

A delightful reminder of the Havana meeting followed, in the showing of a film taken on that memorable occasion by the President of the Union, entitled, "The Cuban Meeting of the American Malacological Union." Another film, also taken by Mr. Smith, and titled "Dredging off Florida," showed the joys and thrills experienced by members of the Union as they collected in the waters off Sanibel and Miami. Mr. Smith said that experiments still are being conducted as to the best methods of operating in the waters on the two sides of the State of Florida as conditions differ greatly. A field day with the Florida Academy of Science was the subject of another interesting reel.

"More about Father Kino" was the title of the paper by Dr. Joshua L. Baily, Jr. This was a contribution giving further light on the work of Eusebio Francisco Kino, a seventeenth century explorer and missionary who reported on shells used by the Indians of Arizona. The identity of these shells is difficult to determine because of paucity of description. Father Kino described them as "beautiful blue shells, larger than the largest pearl shells at La Paz." This would seem to indicate *Haliotis fulgens.* Dr. Baily suggested that Father Kino's name be given to some new species from the Gulf of California region to commemorate a worthy early observer.

Gordon K. MacMillan gave the concluding paper of the afternoon in "Collecting Mollusca in West Virginia." Until recently no systematic collecting of land snails had been done in this State which, until June 20, 1863, was a part of the State of Virginia. Much credit for the present knowledge of the land snail fauna of West Virginia must be given to Dr. G. H. Clapp who partially financed three expeditions with Mr. MacMillan as leader, in 1935, 1936, and 1938. In 1935 and 1936 Mr. MacMillan also accompanied the West Virginia Biological Expedition on its regular six weeks tour of the State. In 1938 nearly four months were spent collecting in nineteen counties.

Many of the present forms of land snails found in the State have a widespread southern range, being found also in the mountains of Alabama, Georgia, South Carolina, North Carolina, Tennessee, and Kentucky. Their presence in West Virginia is explained by their probable migration northward along the broader valleys which have a northern drainage system. Northern forms found in the State probably have migrated southward along larger river courses or are remnants of the southern extent of those snails forced into that territory by the last glacier.

A list of the land snails of West Virginia was given showing those filling in the gap between northern and southern distribution, those forming the northern extent of southern forms, those forming the southern extent of northern forms, species endemic to the State, and a few miscellaneous species.

Sessions on Wednesday were opened at ten o'clock in the morning. Aurele La Rocque was the first speaker. His subject was "Canadian Malacology; Its History and Present Status." This paper presented biographic notes on the workers who have contributed to Canadian conchology from the late sixteenth century to the present. The collections of Canadian shells in private hands and institutions were next reviewed, those in Canada including Toronto, Ottawa, Montreal, Quebec, Victoria, Nova Scotia, New Brunswick, Hamilton, and Perth. Outside of Canada the collections in Boston, Philadelphia, Ann Arbor, Urbana, Stanford University, Harvard, Buffalo, New York, Iowa, and Pittsburgh were mentioned.

The state of our knowledge, including regions explored and unexplored, lists of species and ecological information was reviewed and a few desiderata mentioned, such as unexplored regions, ecological work, taxonomy of difficult groups and new workers. The author emphasized the incompleteness of his presentation and announced that he would be grateful for additional information.

John G. Oughton followed with an appreciation of the late Chief Justice Francis R. Latchford. Mr. Oughton drew on the store of precious memories which had resulted from personal association with this talented judge during the years in which he had resided in Toronto. His avocation during many years was the study of the shells of Canada. Gifted with a retentive memory and an orderly mind, he had available at all times an immense store of knowledge which made the hours spent with him periods of inestimable profit. The Royal Ontario Museum of Zoology has been fortunate in acquiring his large and valuable collection of shells.

"An Invasion of Mississippi River Naiades into the Northern Peninsula of Michigan" by Dr. Henry van der Schalie, was a discussion as to the means by which several species of Mississippi River "unios" could have been brought into the Menominee River and other Green Bay drainages. This invasion must have taken place in post-glacial time and at a period when the Fox River was connected with the Wisconsin River at Portage, Wisconsin. Since several of the species of naiades are *river* forms and are not known to inhabit lake-like bodies such as Lake Winnebago and Green Bay, a continuous and dendritic river system must have existed to permit such river-forms to enter the tributaries of Green Bay. Two facts substantiate this: (1) A former bed of the Fox River still persists in Green Bay. (2) Recent geological data published by Dr. George Stanley indicate that the waters in Green Bay (and northern Lake Michigan) were formerly as much as two hundred feet lower than they are at present. The greatest depth of the waters in Green Bay opposite the mouth of the Menominee River is now not greater than 120 feet which would suggest that a dendritic river pattern seems quite possible. In such an event an invasion of the Mississippi mussels now found in the St. Lawrence drainages of Green Bay probably occurred. The mussels were carried to their respective habitats by various species of fish upon which the mussels are parasitic.

At the conclusion of Dr. van der Schalie's paper luncheon was served in the Museum Tea Room, a much enjoyed and appreciated courtesy by the Board of Trustees of the Royal Ontario Museum.

A short session was held in the afternoon. A paper by Dr. Harald A. Rehder, entitled "An Interesting Bulimulus Problem," was read by Dr. Bartsch in the absence of Dr. Rehder. A study of several distinct races of *Bulimulus quitensis* Pfeiffer, recently sent from Ecuador to the United States National Museum, developed the interesting fact that the closest affinities of this species are with *Naesiotus*, a genus from the Galapagos Islands. So closely does it resemble some forms from the Galapagos that Dr. Rehder has placed this species in *Naesiotus*. The presence of this genus on the west coast of South America is another bit of evidence in favor of the hypothesis that the geographic range of the ancient stock of Bulimids with straight axial riblets on the nuclear whorls once extended pretty well over the region from northern Mexico south to the Argentine and Peru. Then during the Tertiary several of these regions were isolated and there developed the groups of *Orthotomium, Protoglyptus,* and *Naesiotus,* all differing slightly but all obviously related.

The hypothesis is gaining credence that the Galapagos Islands were once connected to the mainland. The presence of *Naesiotus* on the continent seems to support this hypothesis.

A brief paper by Dr. Ricardo de la Torre on "The Probable Causes of Dispersion of Manganese in Jurassic Rocks" was next read. The author has tested a great number of Jurassic limestones from Cuba and other localities to determine the cause of their usual dark color, and has discovered that in all cases it was due principally to the presence of variable amounts of manganese. Because manganese occurs chiefly in those rocks which contain an abundance of ammonites, an investigation was made of living cephalopods to determine whether it is present in these mollusks in sufficient quantities to account for its occurrence in these rocks. It was found that manganese exists in the blood of cephalopods where it takes the place of iron in haemoglobin compounds. The author therefore concludes that the presence and dissemination of manganese in marine Jurassic rocks is due to the abundance and dispersion of ammonites in the Jurassic seas.

A valuable paper was contributed by Dr. Abelardo Moreno on "Anatomical Studies of Cuban Polydontes." This was illustrated with lantern slides of Dr. Moreno's superb drawings of the details of structure studied, which showed definite affinities between certain species by a comparison of the genitalia, as well as the specific differences which separate the groups. The original pen and ink drawings also were shown.

Two field trips were scheduled for the remainder of the afternoon. One of these was under the leadership of Mr. Oughton to collect such species as may be found in the drift of the lake shore. Sunnyside Beach was chosen for this trip and was productive of a number of species of minute land forms as well as the usual fresh water species. The other and smaller group was led by Mr. La Rocque to the Don Valley Brick Yards where fossil shells were sought in the Pleistocene interglacial bed which occurs here. The sun was hot and collecting in both localities was limited to an hour or so.

At six o'clock Mrs. Frank R. Schwengel presided in the Royal York Hotel at her annual cocktail party which has become an appreciated feature of the meetings. Mrs. Schwengel's generous hospitality brought to a pleasant close the activities of the second day.

On Thursday morning the reading of papers was resumed. Calvin Goodrich was the first speaker, his topic being "Phases of Lake Tanganyika Mollusca." Mr. and Mrs. Goodrich had spent several weeks in Africa a year ago and had an opportunity to collect at Lake Tanganyika whose bottom is nearly 2000 feet below sea level. The water is very deep and the shells resemble marine species. Uniformity among species is much stronger than among American forms, characteristics being plainly marked and with little individual variation. While the number of species reported from this lake have been variously given up to two hundred forty-two, Mr. Goodrich collected only fifty. This number was in no way complete because circumstances prevented a thorough survey.

The presidential address by Maxwell Smith was next on the program. This was a valuable paper on "Distribution of East Coast Marine Mollusca together with a Survey of Tertiary Species."

Numerous lantern slides illustrated this address which correlated certain Florida fossil shells with their present day representatives both on the east coast and in the Pacific. The presence of closely related and sometimes identical species in the Florida fossil fauna and such distant regions as the Pacific suggests lines of investigation which may throw light on the distribution and migration of marine mollusks as influenced by possible land changes, ocean currents, and wind forces.

The present state of our knowledge is too incomplete to arrive at any definite conclusions concerning these matters of distribution. With the advent of better exploration of the Tertiary beds of the Antilles, Central and South America, there will be revealed many facts of inestimable value. These coupled with the acquisition of certain mollusks in a living state and consequent exhaustive study of the soft parts will fill many gaps and complete more fully the picture so much desired.

At the conclusion of the Presidential address the meeting adjourned to permit members to inspect the exhibits in the Museum, a special tour having been arranged for the ladies under the leadership of Miss Ruth Home. The unsurpassed collection of Chinese art objects attracted much attention as also the numerous examples of lace and historical costumes.

The ladies were further entertained at one o'clock by Mrs. J. R. Dymond, Mrs. L. L. Snyder, and Mrs. John G. Oughton, at a luncheon served at the University Women's Club, a most enjoyable occasion and another of the appreciated courtesies of our Toronto hostesses.

Discussion of the presidential address was first on the afternoon program, Dr. Pilsbry leading and suggesting a very thorough checking of finds to be sure that shells such as *Cypraea moneta,* reported from Florida, are really living there and are not foreign shells which have been dropped or lost from some collection, citing a storm which wrecked a Souvenir pavilion at Atlantic City and resulted in strewing the beach with all sorts of exotic species.

In the case of *Cypraea moneta,* however, specimens have been reported from so many different localities around Florida and the West Indies that there apparently is little chance for a mistake. Mrs. Schwengel reported a living animal from the Gulf side.

"Non-Marine Mollusca in the Carboniferous of Nova Scotia" was the title of the paper next presented, by Mr. La Rocque. This gave first, an outline of the land and sea areas in Carboniferous time, a short history of investigations on Carboniferous geology in Nova Scotia, and then a detailed account of the Carboniferous non-marine deposits of the region. The vertebrates, insects, and crustaceans were discussed briefly and the mollusca in detail.

A summary of the knowledge of the two known genera of land snails of the Coal beds, *Dendropupa* and *Priscozonites,* was given and of the four genera of fresh water pelecypods, *Anthracomya, Anthraconauta, Naiadites,* and *Asthenodonta.* These last four genera were compared with their representatives in Europe and a brief summary of their importance in stratigraphy was given.

"The Taxonomy of Naiades Inhabiting a Lake Environment" was the next paper, presented by Dr. van der Schalie, giving the result of observations and studies on the same species in lake and river environments. The study had been suggested to Dr. C. J. D. Brown at the biological laboratory at Put-in-Bay and was worked out by Brown, Clark, and Geisner. Age-groups of protected and exposed forms of thirty species from Lake Erie were compared and a remarkable correlation between the degree of stunting and the amount of exposure was noted. Dr. van der Schalie suggested that because of the ready response to environment, it is not wise to call the stunted forms varieties but rather to use the term "form." They should be transplanted from one environment to the other and results noted before deciding whether or not heredity plays any important part in these forms. Just what causes the stunting is still a matter of uncertainty. Since there is no lack of plankton, there is plenty of food available, but it has been suggested that strong wave action may cause the animals to keep their siphons closed for longer periods than in more quiet water, and thus reduce the amount of food taken in to such an extent as to produce the stunting so characteristic of exposed situations.

Mr. MacMillan read a paper on "Land Snails New to the Fauna of Pennsylvania" in which he gave new records for *Polygyra fraterna cava, Paravitrea capsella,* and *Retinella carolinensis* in this State.

"Florida Shells" was a showing of kodachrome slides by Harry B. Archer, with explanatory notes by Dan L. Emery. This exhibition had been first given before the St. Petersburg Shell Club with the object of demonstrating how the gap between the public and the shell collector may be bridged. The pictures had been taken also to the public schools of the city and shown also in hotels and in homes of invalids thus widening the horizons of the audiences in presenting conchology in a popular way. The pictures shown gave thrills of delight to all as the varied hues of many species were reproduced in all their natural splendor.

An invitation from Dr. Louise M. Perry and Mrs. Frank R. Schwengel to hold a meeting in Sanibel, Florida, was presented by Harold R. Robertson. While the spring months were proposed as probably the most propitious time for this meeting, the Christmas holidays were suggested as possibly an even more delightful season for such an occasion. This invitation was gratefully received and will be considered at the next meeting together with one from Dr. R. L. Wilbur of Stanford University and one from Dr. Roy Chapman Andrews of the American Museum of Natural History.

William J. Clench read a letter from Dr. Frank Collins Baker in which he expressed regret at his inability to attend this meeting and asked for an expression from the Union on the matter of eliminating parentheses from names of authors in the nomenclature. After a general discussion of the subject in which it was shown that the practice causes endless research and consumes much valuable time, the motion to recommend to the International Commission on Nomenclature the wisdom of eliminating parentheses, was adopted unanimously. Adjournment followed.

At five o'clock the ladies attended a tea in the charming home of Mrs. H. D. Warren in Wellesley Street. Mrs. Warren's gracious hospitality and the opportunity afforded to view her priceless art treasures will long be remembered by her appreciative guests.

The high point of the convention was the annual dinner held at eight o'clock Thursday evening in the Great Hall, Hart House, University of Toronto, the room in which their majesties, King George VII and Queen Elizabeth, had so recently been entertained. Souvenir menus were attractive with cover design featuring a Nautilus executed on linoleum block by Dr. George E. Fairbairn, who also was responsible for the similar design on the program covers. Paper-weights in the shape of a Nautilus were distributed as favors. These were made by Mr. La Rocque. Copies of *Conchologica Nonsensica,* a diverting little paper of conchological wit and humor, were at each place and provided much amusement. Mr. Robertson acted as Toastmaster, toasts being given to their Majesties, the King and Queen of Canada and the British empire, to President and Mrs. Franklin Delano Roosevelt of the United States, to President and Mrs. Laredo Bru of the Cuban Republic; and to the absent members of the American Malacological Union. Then followed, after the last toast, a moment of silence in tribute to the members who had passed away during the year, the Honorable Chief Justice Francis R. Latchford, Mr. E. G. Vanatta, and Mr. John McCausey.

Adjourning to the Music Room, the annual business meeting was held and the report of the Executive Council presented. The total membership as of June 15, 1939, is two hundred and thirty-six of whom forty-two were added during the past year. There were four resignations and three deaths. There is a balance in the treasury of $414.09.

Because only twenty-two votes were received in response to the question of raising the dues for the purpose of increasing the size of the *Nautilus,* the result was considered as indecisive and instead, a publication by the Union was determined upon, the following resolution being passed:

> That a committee be appointed to consider publishing a periodical which would be helpful to beginners in malacology; said committee to consist of three members.

William J. Clench was named as chairman of the Publication Committee.

It was decided to hold the next meeting in the Academy of Natural Sciences in Philadelphia where the first meeting was held in 1931. This will be the tenth meeting and will especially honor Dr. Henry A. Pilsbry, the first president of the Union.

The election of officers resulted in the following Executive Council for 1939-40: Honorary Presidents: Mrs. Ida S. Oldroyd, Dr. Henry A. Pilsbry, Mrs. Harold R. Robertson. President, Dr. Horace Burrington Baker; Vice-President, Dr. Harald A. Rehder; Corresponding Secretary, Norman W. Lermond; Financial Secretary, Mrs. Harold R. Robertson. Councillors-at-large: Dr. Myra Keen, Aurela La Rocque, Dr. Henry van der Schalie, Dr. H. E. Wheeler. Past Presidents: Dr. Joshua L. Baily, Jr., Dr. Paul Bartsch, William J. Clench, Calvin Goodrich, Dr. Henry A. Pilsbry, Maxwell Smith, Dr. Carlos de la Torre.

After the business session Dr. Pilsbry described a new *Cyphona* recently discovered in Florida. It is called the "fingerprint," *C. signata,* in allusion to the characteristic lines on the body. A description of the species by Dr. Pilsbry and Tom L. McGinty appears in the *Nautilus* for July, 1939.

Mr. Goodrich spoke delightfully on "A Short Visit to Equatorial Africa" illustrating with lantern slides of photographs made in this far-away continent in the very region where Stanley made history in his search for Livingstone.

Moving pictures brought the program to a conclusion. These showed "Collecting in the Bahamas" and "Sponge Fishing at Tarpon Springs," the final reel being one taken the day before by Mr. Smith featuring the American Malacological Union in action on Sunnyside Beach. Resolutions of appreciation and thanks were adopted and the meeting adjourned.

There remained however, one more day before the formal closing of the convention. For this last day the local committee had planned an all-day picnic. Mr. C. M. Heddle had generously loaned the use of his summer home, "Glenorchy," which is on a branch of Oakville Creek for this occasion. It was a perfect situation with ideal conditions for collecting land and fresh water snails. The lodge overlooks the valley where Oakville Creek at this season meanders through the midst of a green strip of meadow between high wooded walls. Steps and hand-rails make easy the descent of a hundred feet or more. After a few hours of collecting the group assembled to compare trophies when it became evident that many an unfortunate mollusk had been made to yield its freedom and eventually its life, to the demands of science. However, it also became evident from the number of freshly broken and empty shells that many others had become food for birds or other wild creatures previous to the advent of the invading malacologists.

Photos of the group were taken on the steps of the lodge and then came the call for luncheon. And were ever more delectable viands set before a hungry crowd? Coffee, salads, ice-cream and cake in abundance had been prepared by Mrs. Oughton and her associates on the most thoughtful and untiring of arrangement committees. Late in the afternoon came the inevitable hour for parting with promises to meet again next year, each bearing away treasured memories of a stimulating four days' assembly, amid surroundings of culture and beauty in the Museum and the city which it graces.

MEMBERS AND VISITORS IN ATTENDANCE

Mr. R. Tucker Abbott, Cambridge, Mass.
Mr. Harry B. Archer, Geneva, N. Y., and St. Petersburg, Fla.
Dr. and Mrs. Joshua L. Baily, Jr., San Diego, Cal.
Dr. Horace B. Baker, Philadelphia, Pa.
Dr. and Mrs. B. R. Bales, Circleville, Ohio
Miss Bernadine Barker, Quincy, Mass.
Dr. Paul Bartsch, Washington, D. C.
Mr. Clifford L. Blakeslee, Pittsford, N. Y.
Miss E. M. Boissonneau, Toronto, Ont.
Mr. William J. Clench, Cambridge, Mass.
Capt. and Mrs. Cockerill, Sanibel, Fla., and Kanshe Lake, Muskoka
Miss Jeannette Danis, Ottawa, Canada
Mr. Donald Day, Lantana, Fla.
Mr. and Mrs. J. W. Donovan, Richmond, Va.
Dr. and Mrs. J. R. Dymond, Toronto, Ont.
Mr. Dan L. Emery, St. Petersburg, Fla.
Dr. and Mrs. F. H. Eno, Columbus, Ohio
Mr. J. H. Fleming, Toronto, Ont.
Mr. Calvin Goodrich, Ann Arbor, Mich.
Mrs. George M. Gordon, St. Petersburg, Fla.
Mr. and Mrs. F. K. Hadley, Malden, Mass.
Mrs. Fred St. John Hoffman, Buffalo, N. Y.
Miss Adele Koto, Beloit, Wis.
Mr. Aurele LaRocque, Ottawa, Canada
Dr. J. M. McKay, Malton, Ont.
Mr. and Mrs. Gordon K. MacMillan, Pittsburgh, Pa.
Mrs. Maxwell Smith, Sr., Lantana, Fla.
Mr. Maxwell Smith, Jr., Lantana, Fla.
Mr. and Mrs. North McLean, Washington, Conn.
Mr. Richard A. McLean, Philadelphia, Pa.
Dr. Abelardo Moreno, Havana, Cuba
Mr. G. Morley Neal, Toronto, Ont.
Mr. Ernest H. Noyes, Chicago, Ill.
Mrs. Ida S. Oldroyd, Stanford University, Cal.
Mr. and Mrs. John G. Oughton, Toronto, Ont.
Mrs. N. R. Perry, Asheville, N. C.
Miss Priscilla Perry, Asheville, N. C.
Dr. Elizabeth Parker, Washington, D. C.
Dr. Henry A. Pilsbry, Philadelphia, Pa.
Mr. and Mrs. Harold R. Robertson, Buffalo, N. Y.
Miss Amy P. Row, Framingham, Mass.
Dr. and Mrs. Henry van der Schalie, Ann Arbor, Mich.
Mr. and Mrs. Eugene H. Schmeck, Niagara Falls, N. Y.
Mrs. Frank R. Schwengel, New York, N. Y.
Dr. Burnett Smith, Skaneateles, N. Y.
Mrs. L. L. Snyder, Toronto, Ont.
Miss Eunice E. Strickler, Buffalo, N. Y.
Mrs. S. A. Strong, Somerville, Mass.
Dr. Carlos de la Torre, Havana, Cuba
Mrs. M. P. Van Woert, St. Petersburg, Fla.
Dr. E. M. Walker, Toronto, Ont.

ACTIVE MEMBERS

ABBOTT, R. TUCKER, 16 Franklin St., Watertown, Mass.

AGUAYO, DR. CARLOS GUILLERMO, Museo Poey, Universidad de la Habana, Cuba. Coll., exch. Cuban land shells for other neotropical shells.

ALDRICH MUSEUM, Box 155, Bay Island, Balboa, Cal. Conch. exhibit. Loans.

ANDREWS, MRS. JAMES N., Somerset, Va.

ARCHER, DR. ALLAN F., Alabama Museum of Natural History, University, Ala.

ARCHER, HARRY B., 4101 Tangerine Ave., St. Petersburg, Fla. (Oct. to June); Geneva, N. Y. (June to Oct.).

ASHBURY, J. H., 2627 Tangerine Ave., St. Petersburg, Fla.

ATKINSON, DR. W. EUGENE, Muskegon County Museum, Muskegon, Mich.

BAILEY, DR. JOHN WENDELL, Dept. of Biology, Univ. of Richmond, Va.

BAILY, DR. AND MRS. JOSHUA L., JR., 4435 Ampudia St., San Diego, Cal.

BAKER, DR. FRANK COLLINS, 439 Natural History, University of Illinois, Urbana, Ill.

BAKER, DR. HORACE B., Zool. Lab., Univ. of Penn., Philadelphia, Pa.

BALCH, DR. FRANCIS N., 60 State St., Boston, Mass.

BALES, DR. AND MRS. B. R., 149 W. Main St., Circleville, Ohio. Coll., exch. land, f.w. and marine shells.

BANKS, GILBERT S., Norfolk St., Holliston, Mass. Coll., exch. land and f.w. shells.

BARKER, MISS BERNADINE, Children's Museum of Boston, Jamaica Plain, Mass.

BARKER C. AUSTIN, 107 Halsey St., Newark, N. J.

BARTSCH, DR. PAUL, Smithsonian Institution, U. S. Nat. Museum, Washington, D. C. Curator of Mollusks and Cenozoic Invertebrates.

BAYER, TED, Riviera, Fla.

BEAL, J. H., Fort Walton, Fla.

BEATTY, MRS. HAROLD C., Mingo Lodge, Skaneateles, N. Y.

BENNETT, GEORGE H., 72 Kimball Beach Rd., Hingham, Mass.

BEQUAERT, DR. JOSEPH, Dept. of Tropical Medicine, Harvard Univ. Medical School, Boston, Mass.

BERMUDEZ, DR. PEDRO J., Apartado 10, Matanzas, Cuba. Exch. Cuban land shells.

BERNER, MISS THELMA L., 20 Girard Place, Buffalo, N. Y.

BERRY, DR. AND MRS. ELMER G., University Museums, Univ. of Mich., Ann Arbor, Mich.

BISHOP, MRS. GRETA B., Private Office, Brazilian Court Hotel, Brazilian Ave. at Hibiscus, Palm Beach, Fla.

BLAKE DR. CHARLES H., Dept. of Biology, Mass. Inst. of Tech., Boston, Mass.

BLAKESLEE, CLIFFORD L., Mendon Center Rd., Pittsford, N. Y. Coll., exch. land and f.w. shells.

BONNEY, MRS. P. A., 106 Silver Lake Rd., Staten Island, N. Y.

BRISCOE, M. S., Storer College, Harpers Ferry, W. Va. Interested in Pupillidae.

BRISKAS, JAMES, Ft. Lauderdale, Fla.

BROOKS, DR. STANLEY T., Carnegie Museum, Pittsburgh, Pa.

BURCH, TOM, 1611 S. Elena Ave., Redondo Beach, Cal. Dealer.

CHACE, MR. AND MRS. EMERY P., P. O. Emp. Box, San Pedro, Cal.

CHAMPION, DR. MERRILL E., North Harwich, Cape Cod, Mass.

CHASE, MRS. MALCOLM, Kelsey City, Fla.

CHEEVER, DR. AUSTIN W., 464 Beacon St., Boston, Mass.

CHEEVER, JOHN ALDEN, 464 Beacon St., Boston, Mass.

CLAAR, ELMER A., 1400 Lake Shore Dr., Chicago, Ill. Coll., exch. Interested in *Cypraea*.

CLARKE, WILLIAM T., JR., Children's Museum of Boston, Jamaica Plain, Mass.

CLENCH, WILLIAM J., Museum of Comp. Zool., Cambridge, Mass. Curator of Mollusks. Coll., exch., buy.

COATS, MISS RUTH E., 702 First St., Tillamoole, Ore. Exch. f.w. and Puget Sd. marines.

COCKERILL, MRS. LILLIAS F., Sanibel, Fla.; R. R. 2, Hilworthy, Ont.

COE, WALTER E., Stamford, Conn.

COOKE, DR. C. MONTAGUE, JR., Kualii, 2859 Manoa Rd., Honolulu, T. H.

CORNWELL, MR. AND MRS. P. N., 356 First St., N., St. Petersburg, Fla. Coll., exch. Dealers.

CROSBY, WILLIAM, San Mateo, Fla.

DARBAKER, DR. L. K., Pittsburgh College of Phar., 1431 Blvd. of the Allies, Pittsburgh, Pa.

DAWES, MRS. BEMAN Y., Hobe Sound, Fla.

DEBOE, MRS. MICHAEL PRICE, 1510 Pizarro St., Coral Gables, Fla.

DEXTER, DR. RALPH W., Kent State University, Kent, Ohio.

DONOVAN, MRS. J. W., Box 818, Richmond, Va.

DOOLITTLE, H. H., 1925 B. Ave., N. E., Cedar Rapids, Iowa.

DOREMUS, E. C., 227 Holmes St., Boonton, N. J.

DRANGA, TED, 1001 S. W. 32nd Ave., Miami, Fla.

DURY, DR. RALPH, Director, Cincinnati Society of Nat. Hist. Museum and Library, Cincinnati, Ohio.

EMERY, DAN L., 121 20th Ave., S., St. Petersburg, Fla. Coll., exch. land, f.w., and marine shells.

ENO, DR. AND MRS. F. H., 222 16th Ave., Columbus, Ohio.

EYERDAM, WALTER J., 1531 19th Ave., N. E., Seattle, Wash.

FAIRBAIRN, DR. GEORGE E., National Museum, Ottawa, Canada. Coll., exch.

FERGUSON, FRANK C., 25-19 Ditmars Blvd., Astoria, N. Y. Coll., exch. land and f.w. shells.

FLUCK, REV. WILLIAM HENRY, 706 Cornelia St., Utica, N. Y. Exch.

FRAMPTON, MR. AND MRS. HENRY G., Box 1052, Miami, Fla.

FREVERT, MRS. WARNER, 504 S. 2nd St., Lindenhurst, L. I., N. Y.

FRIZZELL, DON L., c/o International Petroleum Co., Ltd., Negritos, Peru, S. A. Coll. W. Coast mollusca and Pleistocene marine faunas.

GARDNER, DR. JULIA, U. S. Geological Survey, Washington, D. C.

GILLHAM, BERT A., Rockford, Iowa. Coll., exch. land and f.w. shells.

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* Announcement has just been received of the death of Prof. Hirase on September 9. Our deep sympathy is extended to Mrs. Hirase.

Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. The annual dues are one dollar. There is no initiation fee. For further information address the financial secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, N. Y.

THE
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Devoted to the Interests of Conchologists

Editors and Publishers:
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Tenth Annual Meeting
Academy of Natural Sciences
Philadelphia, Pennsylvania
June 17--21, 1940

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Dr. Henry A. Pilsbry

TENTH ANNUAL MEETING of THE AMERICAN MALACOLOGICAL UNION

1940

From fourteen States, from the District of Columbia, from Canada, and from Cuba, came members of the American Malacological Union to Philadelphia to attend the tenth annual meeting held June 17 to 21, 1940.

It was on April 30, 1931 that the Union was organized in this city in the Academy of Natural Sciences and Dr. Henry A. Pilsbry elected its first president. The program of this tenth meeting was therefore arranged to honor both Dr. Pilsbry and the founder of the Union, Norman W. Lermond.

Registration was on Monday, June 17, in the Academy where a Council meeting was also held at two o'clock in the afternoon. Early comers thus had an opportunity to visit some of the historic and scenic spots in this old American city.

The regular sessions were opened on Tuesday morning, June 18, when Dr. Horace B. Baker, President of the Union, presented Mr. Charles M. B. Cadwalader, President of the Academy, who for the second time welcomed the malacologists of America to the hospitality of his institution.

It was here, he said, that many eminent malacologists had worked: Thomas Say, one of the founders of the Academy and sometimes called "the Father of Conchology," Timothy Conrad, Isaac Lea, George W. Tryon, and finally our own Dr. Pilsbry. In these difficult times it is hard to figure out what may happen next, but scientific work always has gone on, notwithstanding political upheavals; and it always should. It was a small group which founded the Academy in 1812, and the times then were also difficult. But the Academy has survived; and if we continue to keep feet on the ground, heads up, and facing ever forward, our science will be perpetuated also. Mr. Cadwalader concluded by expressing the hope that this tenth meeting would be a successful one.

The first paper was by Drs. Carlos de la Torre and Paul Bartsch on "The Cyclophoridae of Cuba." It was read by Dr. Bartsch who recalled some of his early collecting in Cuba with Dr. de la Torre and the late John B. Henderson, their friendship commencing in 1896. Cuba is incredibly rich in land mollusks, possessing more forms than have been found in the remaining islands and the mainland of North America combined. Of these the Cyclophoridae comprise some of the most difficult genera to unravel. However, having available the enormous collection of Dr. de la Torre combined with the immense amount of material in the U. S. National Museum, they were able to produce a monograph which will shortly be published by the U. S. National Museum.

"The Cyclophoridae of the West Indies, exclusive of Cuba," by Dr. Bartsch was next. Here Dr. Bartsch pointed out that the operculum furnished a splendid criterion for breaking up the huge assemblage of forms into convenient genera and subgenera. By this method it is possible to quickly chase any described form to its proper locus in the proposed arrangement.

This exhaustive study has been greatly aided by the loan of material from The Academy of Sciences of Philadelphia, the Museum of Comparative Zoölogy of Harvard, and especially by the use of the large collections made in Jamaica by Drs. H. B. Baker and d'Alté Welch.

Dr. Bartsch suggested the use of a word in a generic sense, as a catch-all for Cyclophorids which have been described without opercular definition, and whose other shell characters give no definite clue to their relationship. This term is never to have a type and can be added to and subtracted from as our knowledge advances.

In the discussion which followed Dr. Baker emphasized the value of keeping in mind, in dealing with West Indian mollusks, that intensive farming in the islands has restricted forests to small patches on rocky hillsides. Thus the mollusks are found in small colonies where they tend to produce pure lines. These should not be considered either as species or subspecies.

Dr. Pilsbry remarked that mollusks in the tropics have more widely extended different habitats than in temperate regions. *Farcimen* is always very sluggish even for a mollusk, and is found under leaves in the shade. Other Helicoid Cyclophoridae have much the same habit of laziness, refusing to take hold of anything and therefore would not be easily transported by the usual natural means. He objected to the creation of a new generic term to be used as a miscellaneous scrap-basket, and suggested that in pulmonates "Helix" (in quotes) had been used for such indeterminate species.

Dr. Bartsch added the further observation that fire and sword are the order of the day and that wooded areas are rapidly disappearing in many localities so that it is important to make intensive studies now, before it is too late.

Dr. Allan F. Archer said that in the United States rocky areas are not cultivated and therefore forests in such situations preserve isolated faunas.

Dr. Morrison read the third paper on "The Cyclophoridae of the Mainland of North America." This report is the result of a study made by Drs. Bartsch and Morrison. The speaker said that the material available was not abundant, lacking particularly in the matter of anatomical study. Therefore the mainland grouping is not supported by anatomy, and other characters have been called upon for the distinguishing features. The radula was found to be too similar in various species to be of value in diagnosis — the operculum again being found the most significant in structure.

All three of these papers were illustrated by lantern slides.

The first paper in the afternoon was by Dr. Horace B. Baker the title being "Are Snails Animals?", a discussion of the importance of a study of the soft parts, too often disregarded in the past when classification was built chiefly on a consideration of the shell. It is important to recognize both the conchological and malacological phases of the creature — all being parts of a single coordinated organism. However, it is equally important to select features which have an abiding value—no single character being sufficient for a classification basis. This was illustrated by citing the fallacy of classifying whales as fish because of their swimming habit.

Although any attempt to compare the values of the characters of the shells with those of the soft parts is ridiculous, because characters have no intrinsic value, those of the more complex soft parts do have a quantitative advantage, simply because there are more of them. Especially in the species with reduced shells, a study of anatomy is necessary for an understanding of relationships; in fact, dissection may be required for even the identification of the species, certainly in the slugs, and often also in many common Zonitidae. This numerical advantage is counterbalanced by almost equal disadvantages: first, their lack of esthetic appeal; second, distortion due to contraction, and last, but far from least, because the sparsity of our knowledge often renders interpretation of anatomical characters peculiarly difficult. With the help of a model of *Helix pomatia*, a few examples were described, to illustrate the extreme complexity of the soft parts, and the difficulties that their systematic utilization often entails. Anatomical workers have only begun the study; an enormous field of characters still awaits exploration.

Dr. Fritz Haas in discussing this paper told of the early beliefs concerning these animals and the quaint story explaining the origin of slugs: Helix had two children and the older one inherited the house (shell) the younger being left unprotected.

Dr. Bartsch corroborated Dr. Baker's statement that the shell should not be regarded merely as "bones," but that it is a permanent record of the life of the animal and not simply a phase as anatomical features sometimes are.

Shells date back to early Paleozoic time, that long ago era which can never furnish an anatomic record — yet these ancient shells speak eloquently of the physical conditions under which the animals lived.

Dr. Pilsbry warned against disregarding anatomical study since there often is no hint in certain Helicoid shells as to where they should be placed, without the soft parts.

Fred Tobleman called attention to many old works on mollusks which apparently name the shell one thing and the animal another as when the animal of a snail is referred to as a *limax*. This, however, was shown to be merely the author's method of describing the soft, slug-like creature which bore the shell without reference to the technical implication of the word "limax."

Frank Collins Baker demonstrated very clearly by means of chalk drawings, how the Bassommatophora can be separated by the character of the kidney alone.

Dr. Phil Marsh referred to the general custom of basing classification on the genitalia, especially in the pulmonates, evidently because of the assumption that they are the most conservative organs and asked why this is so.

Dr. H. B. Baker answered that while they are conservative as to the individual or species, they are extremely variable in different species and are selected for study chiefly because it has been found that they are the most easily manipulated and most easily understood organs of a snail's anatomy. They therefore are studied just as shells are because they are easiest.

Dr. Morrison explained that if there is a difference in the genitalia it is bound to affect the entire animal and also to prevent crossing where these differences are radical, citing twenty species of June beetles which are to be distinguished only by the genitalia.

M. S. Briscoe was the next speaker, his subject being "The Growth of the Radula in *Goniobasis virginica* (Gmelin)." In all of the snails examined the central teeth were 7-cuspid; the laterals, 7-cuspid; the inner marginals, 7-cuspid; and the outer marginals, 10-cuspid. This indicated that there was neither any change in the number of teeth or cusps as the radula grew. It was determined that the change in the length of the teeth is proportional to the change in the length of the shell, hence, as the shell increased 1 mm. in length the centrals increased .0047 mm. in width and .004 mm. in height; the laterals increased .0077 mm. in length; the inner marginals, .0082 mm. in length; and, the outer marginals, .0087 mm. in length. The laterals seemed to grow faster than the centrals; the inner marginals faster than the laterals; and, the outer marginals faster than the inner marginals.

Mr. Tobleman gave his method for mounting the radula—Just boil it, wash it and stain with chromic acid and mercurochrome. Wash in alcohol, clear in cedar oil or xylol and mount in balsam. Common wood alcohol will answer when it is not easy to procure grain alcohol. Growth can be ascertained by the depth of stain—young teeth taking the stain more deeply than the more mature ones do.

Frank Collins Baker was the next speaker presenting "A New Anatomical Classification of the Planorbidae."

The family is divisible into two subfamilies based on the form of the prostate and ovotestis: Planorbinae and Helisomatinae.

The genera included in Planorbinae are: *Planorbis, Bathyomphalus, Armiger, Gyraulus, Anisus, Hippeutis, Segmentina, Polypylis, Intha, Tropicorbis, Drepanotrema.*

The genera included in Helisomatinae are: *Helisoma, Carinifex, Parapholyx, Planorbula, Menetus, Planorbarius, Australorbis* (?).

Australorbis is a peculiar group related to both Planorbinae and Helisomatinae. Several groups from Africa, and elsewhere, cannot be definitely placed because the animals have not been examined.

The Planorbinae split into five groups, each with distinctive features. These are not to be considered as of supergeneric value.

Four genera have a penial gland: *Segmentina, Hippeutis, Polypylis, Intha.*

Five genera have one or two flagella on the vergic sac: *Segmentina, Hippeutis, Polypylis, Intha, Drepanotrema.*

Two genera have a penial stylet: *Gyraulus, Anisus.*

Four genera have none of the above characteristics, but have simple ovotestis and prostate diverticula: *Planorbis, Armiger, Bathyomphalus, Tropicorbis.*

Considerable discussion followed this valuable paper and concluded the afternoon program.

In the evening Miss Anne Harbison entertained at dinner in the Barclay Hotel. This was a delightful and much appreciated occasion when all had an opportunity to become better acquainted. Before the close of the dinner Mr. Lermond was presented with a beautifully bound testimonial composed by Dr. Bartsch and signed by all present. It read:

> The many things we long to do,
> Crowd oft about us like the lowering sky,
> Each pressing in its way, its claim,
> With its whence, whither and why.
> 'Tis then at times we get a glimpse,
> Through a rift in the leaden gray,
> Of the things in the distance we must do,
> Like a finger pointing the way.
> We are grateful to the rift in the dull gray sky,
> And the glimpse of heavenly blue,
> Which pointed the way to your alert mind,
> To give us the A - M - U.

The first paper on Wednesday was by Dr. B. R. Bales—"The Rock Dwellers of the Florida Keys." This treated of the various mollusks that spend "their entire lives in their self-made sepulchres in the solid coral rock." The speaker reported on eleven different species taken by the aid of hammer and chisel from their burrows and described the difficulty in securing perfect specimens as well as the great obstacles to be overcome before the life histories of this interesting group may be learned. The vast difference in the form of the burrows of the various species was illustrated by specimens of rock fragments showing the actual burrows. Much discussion did not make it clear just how the burrows are formed, though several interesting theories were advanced.

"Marine Mollusca Common to Japan and West North America" by Dr. Myra Keen followed. By means of a chart the species common to both areas were shown as well as those which have been found are not identical. While there exists a definite relationship between the forms on both sides of the ocean, the identity of species is surprisingly small.

Miss Bernadine Barker followed with a showing of natural color movies of Travels in Venezuela, Curacao and Haiti. This record of her trip a year ago was of great beauty and interest. Especially to be noted was the view of hundreds of Cerions at the base of a clump of cacti.

"The Muricid Genus Typhis Subgenus Talityphis," by Dr. Keen was an interesting discussion of the paleontological problem concerning this rare mollusk—illustrated with lantern slides.

The first paper of the afternoon was by H. E. Wheeler and Allan F. Archer, "Mollusks of Monte Sano; An Evaluation of Monte Sano, Alabama, an outstanding land mollusk locality." It was read by Dr. Archer. This area boasts the largest list of land shells for one locality of any place in the world of equal area, eighty-three being listed. The geological formations are advantageous in this respect, affording a diversity of habitats—aquatic areas, ponds, woodlands and xeric conditions. The climate allows for shells maturing at all seasons.

In discussing this paper Dr. Baker contributed the information that Cerions aestivate most of the time and in reality live actively only a few hours.

"Achatinellidae of Oahu, Hawaii," by Dr. d'Alte Welch was next. This group of shells was first discovered in 1787 by Captain Dixon. Gulick was a missionary in Hawaii and visited the sick during a smallpox epidemic. Being interested in these shells he was given numerous specimens by his grateful parishioners. Dr. C. Montague Cook had a huge collection which was studied by Dr. Pilsbry when preparing the volume on Achatinellidae for the *Manual of Conchology.* Dr. Welch explored the region thoroughly and made careful studies measuring critically all specimens and comparing sizes of those collected in different years. He discovered that while there is a tendency to develop white shells in higher altitudes so many exceptions occur that it cannot be recognized as a rule. The paper was fully illustrated with fine color slides.

Mrs. Frank R. Schwengel's annual cocktail party, on this occasion supplemented by a dinner, was a much enjoyed event of the evening. It was held in the Orchid Room of the Warwick Hotel and afforded still another opportunity for pleasant conversation over delicious viands.

The first paper on Thursday morning was by William J. Clench, "Where, Why, When, Shall I Collect?" Mr. Clench has been amazed at the lack of local material in the collection of the Museum of Comparative Zoology, and the necessity for systematic collecting has become apparent. The same situation will be found true of most other regions throughout the country. In general there has been no thorough survey of any extensive areas.

The speaker recommended as the first step in doing a real service to science, to obtain a large State map and plot on it all records of species of land shells—data to be obtained from every institution likely to have them. Do the same for fresh water forms —and unios. The plotting will immediately reveal the unworked areas and suggest fruitful field for research. Whether we like it or not, even negative records are worth while. Therefore, it often is valuable to place on record barren areas.

In New England very little collecting has been done except in Northern Maine. Massachusetts land species are poorly known. The state of New Jersey is little known. No large river of the country has been thoroughly worked throughout its entire length although certain portions may have been collected in again and again.

The marine shells northeast of Boston are pretty well known, but there are few records for Connecticut. South of New Jersey to Beaufort, N. C., has not been well studied.

In the West Indies, collectors are studying land shells and neglecting the marines of many localities, although those of Cuba and Porto Rico are well known.

Texas and coastal Alabama have not been well covered.

The importance of locality records of common species was stressed because their distribution is so valuable in telling the story of early conditions.

Frank Collins Baker gave the admonition to collect everywhere, citing an instance when he found ten species of land snails among the grass of a railway embankment when the thermometer was 100° in the shade. He added that he was at one time an ecologist, but snails haven't read about ecology. They even appear at times on city sidewalks.

Dr. Bales suggested the value of staying in one locality and working it thoroughly every day.

H. B. Baker recounted how Mr. Vanatta found a rare achatinid snail in his own back yard.

"West Indian Naticidae" by Harald A. Rehder, emphasized the importance of the operculum in the classification of the family. Among those with a calcareous operculum which inhabit the West Atlantic region, several groups may be distinguished, some new, based on differences in the operculum.

The typical group *Natica* is an Indo-Pacific genus and is not found in Atlantic waters. *Naticarius* is typified by *N.* canrena, the commonest Natica in the West Indies. *Stigmaulax* contains three Antillean species: *S. cancellata* Hermann, *sulcata* Born and *cubana* Dall. The first two species have long been confused.

Lantern slides illustrated the points mentioned.

"Notes on Polygyridae," by Dr. Pilsbry was next. He spoke primarily on the distribution of the various genera using a map to show their range. The distribution of the Polygyridae is especially interesting because the family is confined to North America, occurring in almost every part of the continent, from Canada and Alaska to Southern Mexico. The problems of distribution are therefore not complicated by possible introduction or migrations from any other part of the world.

Of our nine genera of Polygyridae, *Polygyra* and *Praticolella* are confined to the humid Lower Austral Zone and southward into the Mexican tropics. *Stenotroma, Mesodon* and *Triodopsis* are universally spread over the humid division of the United States, east of about the 100th meridian, and *Allogona* (the *profunda* and *Townsendiana* group) covers much of the same territory. *Vespericola* (*Columbiana* etc.), *Trilobopsis* (*loricata* etc.) and *Ashmunella* are exclusively western genera.

From the time of Binney the strong difference between the eastern and the mountain snail fauna has been noticed, the boundary being at about the 100th meridian, where the more or less wooded and humid region gives way to dry grass land; becoming more arid westward to the eastern foothills of the Rockies. While it is everywhere admitted that temperature is the chief single factor limiting distribution of animals and plants, yet in land mollusks the degree or the lack of humidity is of equal importance. It appears, from the absence of any representatives of the eastern genera of large snails, such as *Triodopsis, Mesodon, Stenotroma,* and *Anguispira* in the middle and southern Rocky Mountain states, and of *Oreohelix* and other western genera eastward, that this barrier is not a new one, but has probably existed far back in the Tertiary. Otherwise some survivors of a mingling of the eastern and western genera would be expected.

There is only one region in the west where species of eastern type occur west of the continental divide — the Columbia River Valley in western Montana, Idaho, Oregon and Washington, where most of the large snails belong to the eastern genera *Triodopsis, Allogona* and *Anguispira,* occurring in association with characteristically western genera. Research into fossil plants has shown that in the Miocene a warm temperate flora extended about as far north as the Arctic Circle. We cannot doubt that at this time, and probably through much of the Pliocene, woodland snails were also spread throughout these northern forests. Even then, however, there seems to have been little mixture of eastern and western genera, so far as we can judge by the present distribution. It appears, however, that sometime in the Pliocene there was humid, woodland communication between this northern area, peopled mainly with characteristically eastern snails, and the Columbia River Valley. Whether the communication was across the Continental Divide in Montana, between the headwaters of the Missouri and the Snake Rivers, or farther north in British America, remains uncertain; but representatives of the eastern genera *Triodopsis, Allogona, Anguispira* and some small forms were able to attain the Columbia Valley. The immigrants may have included only a single species of each of the genera mentioned.

The other western genera of Polygyridae, *Vespericola, Ashmunella* and *Trilobopsis,* are not nearly related to the eastern genera, but date back to some much earlier radiation.

Volume II of "The Land Mollusca of North America" by Dr. Pilsbry is devoted to a review of this family.

Dr. Allan F. Archer next presented a paper on "Pine Woods as Adequate Habitat Types for Land Mollusca." Pine woods of the most natural types yield a number of species of snails and slugs, more in fact, than they are generally credited with. Pines growing as new stands on burned and formerly eroded agricultural land yield rather little.

In the discussion which followed Dr. Bartsch spoke of the fact that land mollusks feed largely on micro-fungi and confervae and consequently are most abundant in forests which favor such fungoid growth.

Dr. Welch gave some of his experiences in attempting to determine and cultivate the kinds of fungi certain snails prefer, by placing the feces in culture dishes to induce growth of any fungi which may have survived the digestive tract of the snail. The first growth obtained, however, was of bacteria, and when a fungus finally appeared the snails would not eat it.

The first paper Thursday afternoon was by Dr. Morrison, "Population Studies on Goniobasis." This gave results of observations on *Goniobasis paupercula* and *G. acuta* along the Tennessee River in Alabama during December, 1937. Many snails were collected and screened as a quick method of separating according to size, and the modes of the population samples readily determined. *Goniobasis paupercula,* living in the perennially cold water of a large spring, was found to have two modes, indicating a two-year cycle, as is known for *G. virginica* and *Nitrocris carinata,* in the Washington, D. C., region. In contrast, *G. acuta,* living in shallow creeks which warm up materially during many months of the year, was observed to have only one mode: i.e., a one-year life cycle. A few eggs of *G. acuta* were also collected in December, indicating a protracted egg-laying season, as well as a shortening of the life cycle, in these warm southern waters.

"Illustrations of Florida Liguus" was a showing of natural color photographs of specimens collected by Ralph Humes and was presented by Dr. Pilsbry in the absence of Mr. Humes. Dr. Pilsbry explained that Mr. Humes will go to any length to obtain specimens. In the Pinecrest region there are two hundred named hammocks each supporting its Liguus fauna. To reach some of these places is not easy because sharp limestone occurs everywhere and one has to use great care in traversing the region safely under the best of transportation facilities. The great number of series of specimens exhibited was amazing to anyone not thoroughly familiar with the wealth of color varieties which occur in Florida.

"Collecting in Santo Domingo" was a natural color movie by Henry D. Russell, and vividly illustrated some reasons why conchologists leave home. When such delightful experiences beckon as those which the photographer enjoyed in 1937, the call is irresistible.

The regular business meeting was held during the afternoon, at which time it was decided to make application to join the American Association for the Advancement of Science. This affiliation will give to the Union the status in the scientific world to which it is entitled as an organization of national importance.

Following a plea by Mrs. North McLean that one day of future sessions be devoted to papers especially designed to help the amateur, it was decided to hold such a symposium at the next meeting. The incoming President was directed to name a Symposium Committee Chairman with authority to carry out the program outlined.*

The long-standing invitation from Mr. Lermond to hold a meeting in Maine was accepted for August 5 to 8, 1941.

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*Dr. B. R. Bales was made Chairman of this Committee. An announcement of the program for 1941 will be found on page 12.

The resignation of Aurele La Rocque from the Council because the nature of his work is carrying him too far from malacology, was accepted with regret.

Mr. John Oughton of the Royal Ontario Museum of Zoology, was elected to fill the vacancy created by Mr. La Rocque's resignation, thus continuing a Canadian representative on the Council.

Mr. La Rocque also resigned as Chairman of the Checklist Committee. Dr. Joshua L. Baily, Jr., and Dr. Myra Keen were added to this Committee with the suggestion that Dr. Baily be made Chairman.

Officers were elected as follows: President, Dr. Harald A. Rehder; Vice-President, Mr. Frank Collins Baker; Corresponding Secretary, Mr. Norman W. Lermond; Financial Secretary, Mrs. Harold R. Robertson. Councillors: Dr. Myra Keen, Mr. John Oughton, Dr. Henry van der Schalie, Mr. H. E. Wheeler.

Past Presidents (continuing on the Council without reelection): Dr. Henry A. Pilsbry (1931); Dr. Paul Bartsch (1932); Prof. Junius Henderson* (1933); Mr. William J. Clench (1934); Mr. Calvin Goodrich (1935); Dr. Joshua L. Baily, Jr. (1936); Dr. Carlos de la Torre (1937); Mr. Maxwell Smith (1938); Dr. Horace B. Baker (1939).

Honorary Presidents: Mrs. Ida S. Oldroyd†, Dr. Henry A. Pilsbry, Mrs. Harold R. Robertson.

The Library of the Academy of Natural Sciences was chosen for the scene of the annual dinner which was held there Thursday evening. This was the climax of the convention and was the occasion for paying tribute to Dr. Pilsbry as the Union's first president and the dean of American malacologists.

Souvenir menus were attractively printed in green on white with a splendid picture of Dr. Pilsbry at his desk, a picture which undoubtedly will be found framed and hanging in many a malacologist's office or Shell Room along with that other souvenir photograph, the one of Dr. de la Torre, which is cherished by all who were recipients of his bounty when the Union met in Havana in 1938.

At the conclusion of the dinner, Dr. Bartsch spoke feelingly of the man whom the Union wished to honor and, as Toastmaster, called upon various speakers to express their appreciation of him as teacher, friend, and camp companion.

Dr. Horace B. Baker was the first speaker, giving an appreciative sketch of Dr. Pilsbry's life and work. Dr. de la Torre expressed his grateful appreciation of the work he had done on the malacology of Cuba and of the close friendship which had resulted from their collaboration on innumerable occasions. Mr. Clench and Mr. Frank Collins Baker spoke affectionately of his ever-ready willingness to help in any problem or project suggested. Mr. Clench had shared with Dr. Pilsbry the inconveniences of camp life and the hardships and joys of field exploration in remote regions; and Mr. Baker, as a Jessup student, had the inestimable privilege of having him for his first teacher in conchology.

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*Deceased.

†It is with sorrow that we record the death of Mrs. Oldroyd at the age of 85, on July 8, after several months of declining health. Because of her condition she was unable to be present at this meeting, the second only which she had not attended since the organization of the Union in 1931.

Dr. Bales told of the pleasures of collecting with him in Florida and of his unfailing good-nature under trying conditions of weather and water. Mr. James A. Rehn, Chairman of the Publication Committee of the Academy, gave assurance that publication of Dr. Pilsbry's monumental work on The Land Mollusca of North America now being issued in three volumes will be completed as rapidly as possible. In accomplishing the enormous amount of research required to bring this contribution to completion, an indefatigable purpose has been manifested, inspired, perhaps, by the spirit of Thomas Say whispering, "Carry on!"

Mrs. Harold R. Robertson was then called upon to present the concrete evidence of the esteem in which Dr. Pilsbry is held by the Union, in announcing that the manuscript of a Bibliography of Dr. Pilsbry's complete works to date had been prepared and would be published at once. This bibliography of 968 titles will serve as a stimulus for future workers in showing what it is possible for one man to do in his first fifty-eight years of action.

Dr. Pilsbry responded by quoting Henry Ward Beecher's words on a similar occasion of felicitation, when he said that he felt like a buckwheat cake over which a pitcher of maple syrup had been poured. Dr. Pilsbry felt that he himself was fairly dripping with syrup, but nevertheless unspeakably grateful for everything that had been said and for what the organization had done in his honor. One last token of affection, a red rose, was presented by Mrs. Frank R. Schwengel who made an affecting little speech as she pinned the flower on his lapel.

Friday was given over to a picnic and field trip at the Morris Arboretum. Leaving the Academy about nine o'clock a stop was made on the way for an hour or more to collect at the bridge over Wissahickon Creek.

Lunch was served at Bloomfield Park near the Arboretum where Dr. H. B. Baker and Mrs. A. Marian McClay had prepared a wonderful repast, Mrs. North McLean and Misses Elizabeth and Grace Pilsbry assisting in serving. Full justice was done it by the hungry collectors.

Early in the afternoon came the final leave taking to meet again next summer, in Maine.

December, 1940. MRS. HAROLD R. ROBERTSON.

SYMPOSIUM FOR 1941

METHODS IN THE COLLECTING AND PREPARATION OF MOLLUSKS

The program has been divided into seven sections as follows:

1. Land shells exclusive of arboreal snails
2. Arboreal snails such as *Liguus, Drymeas,* etc.
3. Fresh water snails
4. Fresh water bivalves
5. Marine collecting—shore and shallow water
6. Marine collecting—deeper water collecting with diving goggles or head helmet
7. Marine collecting—dredging or other deep water collecting

Each of these papers will be prepared by an active and competent collector in his particular field of study and we hope to assemble a mass of important information that will be of practical import to the average collector.

It is the hope that any member of the Union desiring any special information will communicate with me, stating what information they desire so that I may transmit their desires to the person in charge of that particular section of the symposium.

While there is no doubt but that a large amount of valuable and practical information will be incorporated in this symposium, it will be all the more complete and valuable if members will cooperate by voicing their desires, and we want each member to feel free to ask any question, even though it may seem a simple one to him.

Address all information and inquiries to Dr. B. R. Bales, Chairman, 149 West Main Street, Circleville, Ohio.

MEMBERS AND VISITORS IN ATTENDANCE

DR. ALLAN F. ARCHER, Montgomery, Ala.
REV. DAVID T. ATWATER, Brooklyn, N. Y.
FRANK COLLINS BAKER, Urbana, Ill.
DR. HORACE B. BAKER, Philadelphia, Pa.
DR. B. R. BALES, Circleville, Ohio
GILBERT S. BANKS, Holliston, Mass.
BERNADINE BARKER, Quincy, Mass.
DR. PAUL BARTSCH, Washington, D. C.
THELMA L. BERNER, Buffalo, N. Y.
MRS. F. S. BREEVER, Urbana, Ill.
M. S. BRISCOE, Harpers Ferry, W. Va.
EDITH R. CAMPBELL, Wilmington, Del.
J. ALDEN CHEEVER, Boston, Mass.
WILLIAM J. CLENCH, Cambridge, Mass.
CAPT. AND MRS. ROBERT C. COCKERILL, Sanibel, Fla., and Hilworthy, Ont.
GEORGE R. COVENTRY, Collingdale, Pa.
REV. PAUL D. FORD, Sunbury, Pa.
RICHARD W. FOSTER, Cambridge, Mass.
JOSEPH S. GAYLORD, East Longmeadow, Mass.
DR. FRITZ HAAS, Chicago, Ill.
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ANNE HARBISON, Philadelphia, Pa.
MRS. FRED ST. JOHN HOFFMAN, Buffalo, N. Y.
MR. AND MRS. RALPH H. HUMES, Coconut Grove, Fla.
DR. MYRA KEEN, Stanford University, Cal.
ADELE KOTO, Beloit, Wis.
NORMAN W. LERMOND, Thomaston, Me.
E. SIDNEY MARKS, Arlington, N. J.
DR. PHIL C. MARSH, Jackson, Mich.
WILLIAM B. MARSHALL, Washington, D. C.
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PAULINE MOYD, New York, N. Y.
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MRS. FRANK R. SCHWENGEL, New York, N. Y.
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MRS. S. A. STRONG, Somerville, Mass.
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Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. The annual dues are one dollar. There is no initiation fee. For further information address the financial secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, N. Y.

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THE ELEVENTH ANNUAL MEETING

ROCKLAND AND THOMASTON, MAINE

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METHODS of COLLECTING and PRESERVING MOLLUSKS

Wednesday, August 27, 1941

MEMBERSHIP LIST REVISED JANUARY, 1942

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ELEVENTH ANNUAL MEETING OF THE AMERICAN MALACOLOGICAL UNION

1941

The American Malacological Union went "down east" for its Eleventh Annual Meeting, August 26 to 29, 1941, accepting an invitation from Norman W. Lermond, Director of the Knox Academy of Arts and Sciences at Thomaston, Maine, to hold this meeting in Thomaston and Rockland. Convention headquarters were in Crescent Beach Inn, Rockland, a situation unusually well adapted for pleasure and convenience in all respects. A homelike atmosphere created by attentive hosts, Mr. and Mrs. George D. Sleeper and staff, encouraged freedom to collect at any and all hours, and the large recreation hall was perfect for meetings.

The opening session was held on Tuesday afternoon, August 26, at 2:30, when Dr. Harald A. Rehder, President, called the convention to order and introduced Mr. Lermond who welcomed the visitors to Maine with its beautiful scenery and its unsurpassed opportunities for collecting.

The first paper was by Dr. Paul Bartsch on "The Progress of the Studies on West Indian Cyclophoridae by Drs. Carlos de la Torre, Paul Bartsch, and J. P. E. Morrison." Dr. Bartsch stated that the several nomenclatorial problems questioned by Dr. H. B. Baker in a recent number of *The Nautilus* would find their answer in the paper now almost completed on the remaining West Indian Annulariid mollusks.

The Cuban representatives of the Cyclophoridae are listed under 24 species and 59 subspecies; the rest of the West Indies embraces 105 species and 9 subspecies, while the mainland forms are represented by 149 species and 18 subspecies. Summing up, we have 278 species and 86 subspecies of American members now recognized in this family. The illustrations will be covered by 40 plates bearing 488 figures. Dr. de la Torre and Dr. Bartsch have also revised the classification of the Cuban Helicinidae.

"Land and Freshwater Shells collected in South America in 1938 and 1939," by Walter J. Eyerdam, was read by William J. Clench. A member of the botanical expedition sent to South America in July, 1938, by Dr. Thomas H. Goodspeed, Director of the Botanical Garden of the University of California, Mr. Eyerdam, nevertheless, was given permission to collect such land and freshwater shells as opportunity afforded along the scheduled route, one set for the University, one for the Museum of Comparative Zoology at Cambridge, Mass., and one for himself. A resume of the route followed and localities where shells were taken was the theme of the paper. Mr. Clench will publish a report on the series collected.

Mr. Olof O. Nylander presented three short papers. The first, "Mollusks at Low Tide in Eastport," gave the result of various collecting trips to this locality since 1906 when Mr. Nylander collected for the New York State Museum.

"*Lymnaea stagnalis* in Chaleur Bay, Quebec," was Mr. Nylander's second offering, and related to the occurrence of shells of this mollusk found in October, 1940, in a marl deposit on a farm belonging to Mr. Leazari Henry in East Bonaventure, north of Bay Chaleur. The species has not been found in a living state in this region though abundant in the top layer of this deposit.

"*Lymnaea stagnalis* at Houlton, Maine," was Mr. Nylander's final report, an account of his first discovery of *L. stagnalis* in Maine, August, 1933, when he found it in a marl deposit on the farm of Edward C. Currier in Houlton.

Mrs. Frank R. Schwengel generously entertained the group at a buffet dinner at six o'clock and a showing of natural color photographs taken by Mr. and Mrs. Frank K. Hadley was much enjoyed in the evening.

Wednesday was given over to the Symposium on "Methods of Collecting and Preserving Mollusca," with the exception of a paper by Mrs. Schwengel on "Habits of a Floridian Species of *Lobiger*" which has since been published in *The Nautilus* (October, 1941), and one by Dr. Fritz Haas on "Some Life Habits of West Coast Marine Bivalves." This paper will appear in *The Nautilus* (April, 1942).

The Symposium program was arranged by Dr. B. R. Bales, Chairman, who was unfortunately unable to attend. At its conclusion Mrs. North McLean moved a vote of thanks to Dr. Bales for his part in arranging such a valuable contribution for the benefit of the serious collector. Unanimously carried. It was also decided that the papers be printed for distribution.

The following titles were presented: "Collecting of Freshwater Gastropods," by Frank Collins Baker; "Collecting Freshwater Bivalves," by Henry van der Schalie; "Collecting Land Mollusks," by William J. Clench; "Shore and Shallow Water Collecting," by Dr. Bales, read by Tucker Abbott; "Dredging for Everyone," by Tom Burch, read by Mrs. Schwengel, who added notes on "Dredging in Florida Waters;" "Diving as Applied to Shell Collecting," by Tom McGinty, read by Harold R. Robertson.

At eight o'clock came time for the annual dinner served in the Inn. Covers were laid for sixty-seven, the long tables centered with flowers and made even more attractive by dainty place cards provided by Mr. Lermond. These featured an abundant Maine Mollusk, *Littorina litorea,* and had been made by Mrs. Edna G. Gordon of the St. Petersburg Shell Club.

At the conclusion of the bounteous and delicious shore dinner served on this occasion, Dr. Bartsch called for a moment of silence in memory of our departed members, Mrs. Ida S. Oldroyd and Mrs. George Sargeant.

The annual election was then held, Frank Collins Baker being elected President, Dr. Louise M. Perry, Vice-President, Norman W. Lermond, Corresponding Secretary, and Mrs. Harold R. Robertson, Financial Secretary.

First on the evening program which followed, was a talk by Dr. Merrill Moore on "The Study and Collecting of Shells as a Form of Occupational Therapy". Dr. Moore told of his success with patients suffering from nervous disorders resulting from worry and overwork when they have been induced to take up the study of these fascinating objects.* Specimens of *Pecten grandis* were distributed with a popular description of this characterisic Maine species, and a "learning board" was exhibited. This is a shallow tray about 15x24 inches in which specimens are fastened with typed labels. By frequent reference to such a board, shells and their names are easily learned.

Harry B. Archer concluded the program with a showing of his unsurpassed natural color photographs of Florida Shells.

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* This paper has been printed in full in *The Nautilus,* January, 1942.

On Thursday came the boat trip to islands off shore for collecting. Mr. Sleeper had provided two boats for this event which was enjoyed to the utmost by all who participated. These islands rise to a great height above the sea at low tide.

The first stop was at High Island where periwinkles and dog whelks could be picked from the rocks when the boat tied up at the foot of a ladder which was fastened to the side of the stone wharf and which it was necessary to climb in order to reach a landing place.

But once on the top the woods were found luxuriant with ferns and mosses and even mollusks, although many of the latter were in the nature of fragments of marine species broken on the bare rocks by feasting gulls.

After an hour or more here the trip was resumed with Andrews Island as the objective. Here, too, were fucus-draped rocks with Littorinas and Thais the most abundant mollusks. Numerous specimens of *Anguispira alternata* in aestivating colonies were discovered in an unusual situation in the midst of the thick masses of needles under coniferous trees which form a large part of the vegetation of the island. But probably Andrews Island will be longest remembered for the shore dinner which Mr. Sleeper had provided. Lobsters cooked in sea water, as many as one could eat, sandwiches, doughnuts and coffee made a feast which, eaten under the open sky of an August afternoon in Maine, was a supreme delight.

Our host proved to be an accomplished musician on the accordion and after dinner entertained the group with numerous selections which were thoroughly enjoyed. The return trip was made in time for supper at the Inn.

In the evening three final papers were presented. The first of these, "Hawaiian Winter" by William J. Clench featured natural color moving pictures taken when Mr. Clench was in Hawaii working on collections in the Bishop Museum last winter. While they exhibited much of the beauty of the islands they also showed well the difficulties of collecting in apparently inaccessible situations such as the hanging valleys where Achatinellidae have developed in such amazing variety.

"Nudibranchs and Nematocysts" by Henry D. Russell was illustrated by moving pictures showing the almost unbelievable process by which certain nudibranchs become ingested with nematocysts from sea anemones and thus themselves become armed against attack from enemies.

Richard W. Foster spoke on "The Poison of Cephalopods" explaining his research on the action of the poison which members of this group inject into the wound made by their beaks in attacking their prey. This poison is an alkaloid which causes paralysis and eventual death.

At the conclusion of the papers came a clambake on the shore with roast corn and frankfurters, a happy climax in the hospitality which Mr. Sleeper so generously bestowed on his guests at the Inn where accommodations were so pleasant and where all were made to feel so much at home.

Friday morning saw the departure of most of the assembly after first visiting the Knox Museum and Arboretum in Thomaston. Here Mr. Lermond welcomed the members to his very attractive museum which stands in the midst of a woods of evergreens and other native trees, and houses a splendid collection of local and foreign shells and other natural history specimens. There is an unusually fine series of *Pecten grandis* and also of *Spondylus,* a delight to see.

Mr. Lermond distributed as souvenirs place cards which Mrs. Gordon had made to be used for a luncheon in the Arboretum but which had been cancelled because of a heavy rain. These place cards were as dainty and beautiful as those for the banquet and featured another New England mollusk, *Thais lapillus*.

Here the incoming President, Frank Collins Baker, formally closed the convention and members soon were separating for their homeward journeys to distant states.

December 1, 1941 Imogene C. Robertson

THE ANNUAL MEETING FOR 1942

It is with regret that we are obliged to announce that there will be no annual meeting this year.

An invitation to Washington was accepted but it soon became apparent that a meeting in that city could not be successfully arranged due to war conditions. Sanibel was next in order, and plans were begun to hold the meeting there in April. However, with war conditions extended to the entire country and transportation problems daily becoming more acute, it has been thought best, after much consultation among the members of the Council, to suspend meetings for the duration of the war.

Methods of Collecting and Preserving Mollusca

Symposium Papers

COLLECTING AND PRESERVING FRESH WATER SNAILS

By Frank C. Baker
Curator Emeritus, Museum of Natural History, University of Illinois

Fresh water snails have attracted the attention of men and women for years and many quite extensive collections have been gathered which have been of considerable scientific importance. Directions for collecting these inhabitants of the waters and preserving them for the cabinet are not usually available, and possibly many amateurs have been deterred from attempting to gather collections of fresh water snails for lack of proper directions. The methods of collecting and preserving these snails are simple and are briefly described in the pages that follow.

Where Fresh Water Snails may be Found

Fresh water snails may be found in almost any body of water, even the ephemeral pools of meadows and woodlands. There is scarcely a river, creek, pond or lake that does not contain one or more species of snails. Some species, as the pond snails—*Lymnaea* and the planorbids—prefer quiet bodies of water where food is plentiful among the aquatic vegetation. Other snails, as *Amnicola, Goniobasis* and *Pleurocera,* prefer the shores of rivers. In some rivers, as in the Wabash in Indiana, the snails live in shallow water on ledges of limestone or other rock which extend far out from the shore. Such a situation occurs at New Harmony, Indiana, where the father of American conchology, Thomas Say, made many of his collections.

Lakes usually contain many species of snails which live among the aquatic vegetation near the shore or on rocky beaches. Some of the lymnaeas, planorbes and physas may be found in such habitats. Often beach pools, areas of water behind barriers which have been formed by the waves of the lake, afford good collecting localities. In America snails are not found in the deep part of lakes, as is the case in some European and Asiatic localities (Lake Balaton, Lake Baikal, Lake Lèman and others), but are confined to the limit of rooted vegetation, not to exceed 15 feet in depth. The great majority, however, live in water six feet or less in depth. Roadside rills where there is little water and much vegetation may contain several kinds of small snails, as *Menetus, Fossaria* and *Planorbula.*

Snails are not, as a rule, found in cold lakes at high altitudes or in cold, swiftly flowing streams like those in the New England States and in the Rocky Mountains. Few or no snails will be found in waters polluted by sewage or manufacturing wastes. A safe admonition to the amateur snail hunter, however, is to look everywhere for snails where there is water. Even wet meadows and the damp shores of ponds and rivers may harbor forms of the small lymnaeids called *Fossaria.* Fresh water limpets (*Ferrissia,* etc.) may often be found in dead clam shells or on rocks.

How to Collect the Snails

Collecting fresh water snails is usually a simple process much more easily accomplished than collecting insects, especially butterflies. They do not fly away and are easily approached for capture. Thanks to one of our oldest members, Dr. Bryant Walker, now gone from among us, who lived in Detroit, Michigan, a useful dipper was invented which is fittingly called a Walker dipper or dredge. It is so efficient that usually no other implement is necessary. This dipper is about 6 inches in diameter at the top and 5 inches in diameter at the bottom, with a depth of about 3 inches. The bottom is covered with copper wire screening of a sufficiently large mesh to allow the mud and water to run through and retain the shells. It is fastened to a handle five or six feet in length. A broom handle often makes a good handle. The dipper should be made of copper to prevent rusting. If copper is not available then the sides of the dipper may be made of tinned iron and the bottom may be of copper. A dipper of this kind has been in use by the writer for several years and shows no indication of wearing out. I feel sure that the museum of the University of Michigan would be willing to furnish specifications for this dredge or dipper and it could be made by any good tinsmith.

With this very efficient collecting apparatus there is little difficulty in sweeping any body of water for possible snails. It may be used on the shore of lakes and ponds, to explore mud holes and small streams or sweep the bottom of a lake in water down to six feet in depth. It is excellent for sweeping through vegetation in a lake or river, the snails falling into the dipper from which they are easily picked out. For collecting snails in large areas of vegetation in lakes or ponds, as in the pond weeds (*Potamogeton*), it is best to pull up some of the vegetation and place this in a large pail. Washing and shaking this vegetation in the pail will dislodge the snails and often several hundred will be found in the bottom of the pail after this process. Pond lily leaves, and also the stems of sedges (*Typha, Scirpus,* etc.) should be carefully examined for small snails, especially the little fresh water limpets, *Ferrissia.* Many larger snails, as *Physa,* lymnaeids, and small planorbids, as well as *Amnicola,* may also be found on lily leaves. Most lake collecting should be done from a row boat. In some localities the vegetation may be pulled to shore with a rake.

Such large snails as *Campeloma* and *Viviparus* may be found by running the hand through the mud and sand bordering the shore of lakes and rivers where they live, often in large numbers. The Walker dipper is also useful in such places. From rocks on shores of rivers and lakes the snails may be picked by hand. This is especially true of *Goniobasis, Pleurocera, Somatogyrus* and other snails found in our mid-western streams.

Containers for the snails as they are collected may be of various types. If the collecting is being done from a row boat a pail (or several small pails) may be used. Empty tin cans, from which the cover has been removed by a modern can opener and the edge is smooth, are excellent, and specimens from different localities or habitats may be separated, as is always desirable. If one is traveling overland, either tramping or by the ever useful family auto, the containers may be some of the wide-mouthed medicine bottles for pills, which have screw stoppers of hard rubber. Several of these may be carried in large pockets or in a canvas bag which may be slung over the shoulder. If the collecting is by auto the cans mentioned for lake collecting may be used. Often the jars (pint) used for canning fruit are useful for this purpose.

In deep water work an Ekman dredge made of brass is necessary, but this is rather complicated and the average collector will scarcely find use for this apparatus.

How to Prepare Snails for the Cabinet

It is of the first importance to properly clean and prepare the snails for preservation. The small species, such as *Amnicola, Valvata, Gyraulus,* etc., may be placed in a solution of about 75% grain alcohol. The snails will retract well within the shell and away from the aperture and the operculum of such genera as *Amnicola* and *Valvata,* which should be saved in all cases, will be preserved. The snails will die and may be dried on blotting paper. They will leave no offensive odor.

Larger species, and those small species from which the animal can be easily removed, should be killed by immersion in boiling water for a few minutes. The animal may be extracted with a dissecting needle, which may easily be made by forcing the eye-end of a medium sized needle into a handle of soft wood, the handle to be four or five inches in length. The bodies of the snails will easily pull away from the shells if the needle is pushed firmly into the snail's body and the shell is given a slight twist in the opposite direction. A pair of small forceps, which should be an indispensable implement of every collector's outfit, will also help in extracting the dead bodies of the snails.

In such large snails as *Campeloma* and *Viviparus,* as well as the elongated snails of *Goniobasis* and *Pleurocera,* the body will often come away minus the liver which remains within the shell. For cleaning these snails a wire bent in the form of a corkscrew will be found helpful. This should be sharpened at the end. The writer has used a small fish hook for this purpose. A syringe is useful to wash out the animal matter from the larger shells. Every effort should be made to remove all of the animal possible from the shell to avoid disagreeable odors. In cleaning the large snails, if you hold firmly to the body with the needle or corkscrew apparatus and carefully twist the shell the body of the snail will usually come away easily.

If there are incrustations of foreign matter on the shells, especially the larger species, these may be removed by brushing with an old tooth brush. Sometimes algal or lime incrustations will need to be scraped off with a knife. In some cases it may be best to remove the incrustations by the aid of oxalic acid. This should be done carefully by brushing on the acid with a camel's hair brush and then the surface washed with water. Dipping in the oxalic acid may be necessary and in this case the whole shell should be immersed for a few moments and then washed in cold water to remove the acid, which acts very quickly on the limy shells.

The operculum of the larger shells should be preserved by cutting it away from the muscular foot. All traces of flesh must be removed from the under side of the operculum. It should be dried and placed on a bit of cotton in the aperture of the shell from which the operculum originally came. This is important. All large shells should be carefully dried by natural, not artificial, heat. Do not place snail shells on a hot stove or heater or in the oven. Room temperature is sufficient. Campeloma and Viviparus may be rubbed with a cloth slightly moistened with vaseline to retain the original luster of the shell. All excess vaseline should be removed or the shell will feel greasy. This treatment also helps to keep the epidermis from cracking or peeling.

The little limpet snails, *Ferrissia,* should have the animal carefully removed from the shell with the fine point of a dissecting needle. These little limpets are usually coated with algae or lime and may be cleaned by being allowed to float, upside down, in the surface of a small quantity of oxalic acid, after which they may be washed and carefully wiped with a camel's hair brush. The shell may be easily cleaned if held, bottom upward, on the tip of the index finger.

Cabinets for Holding Collections

The beauty of a collection, as well as its scientific value, will depend largely upon its method of preservation. The specimens may be kept in many different kinds of containers. Small vials may be used for the smaller species, as *Amnicola, Valvata, Physa, Ferrissia, Fossaria, Gyraulus,* etc. Each vial should be labeled. However, most collectors will desire some kind of pasteboard trays to hold the vials and the trays will need some kind of a cabinet of drawers to hold them. This may be of any size or style to fit the collector's pocketbook. For small specimens, which will include the greater number of fresh water snails, the writer has used legal blank cases which are obtainable from any large dealer in office supplies. Each case contains ten drawers, each 14½ inches in length, 9 inches in width and one inch deep. If pasteboard trays are used, each with a 1 x 2 inch unit, each drawer will hold 56 trays and the whole cabinet will accommodate 560 trays.

If the unit decided upon is 1 x 2 inches (and ½ inch in depth) then the other sizes may be 2 x 2, 2 x 3, 2 x 4 and 4 x 4 inches. The smallest snails will require glass vials to fit into the smallest tray units. These may be homeopathic vials, capsules, or, better still, the shell vials which are now carried by many glass companies and nearly all natural history supply houses. These last have the advantage of being without a contracted neck, as is the case with the homeopathic vials. The vials should be just short enough to fit into the length of the tray with a short cork. Corks are slightly expensive and a wad of cotton will serve the purpose quite as well. The most useful sizes of shell vials will be 40 x 10, 40 x 15 and 40 x 20 mm. Larger vials may be used for the large specimens, fitting into the larger trays. The legal blank cases have served the writer admirably for many years and he has eighteen in use.

The larger species and specimens, such as *Campeloma, Viviparus,* large lymnaeas, planorbids and some goniobases and pleuroceras, may lie loose in the tray, care being taken to give each specimen a catalog number. For this a good indelible ink should be used, such as the kind known under the name of eternal ink.

Labeling the Collections

The value of a collection of fresh water snails depends entirely upon its labeling. Certain definite information must be placed with each tray and bottle of specimens. The general information as to locality, nature of water body and any particular notes concerning the habitat should be placed in the container when the specimens are collected. This rule should never be broken and the memory should not be trusted since confusion may result if more than one habitat is included in the field trip. The information on the label in the cabinet tray should include the name of the snail, its exact location geographically, its habitat relationship, when collected and by whom. The collector should have a catalog number, beginning with 1, and each lot, in vial or tray, should bear a definite number which should be in each bottle or marked upon each loose shell. A sample label is shown below.

No. 506. Aug. 5, 1921.
Helisoma anceps (Menke)
Winnebago Lake, near Oshkosh, Wis.
On a rocky shore in water 3 ft. deep.
F. C. Baker coll.

A card catalog may also be kept, arranged by genera, which might include additional information to that shown on the label in the tray. Such information adds greatly to the value of a collection. Habitat information is usually rarely given by a collector. Among the thousands of specimens examined by the writer, loaned or received from general collectors, not more than 5% had any information of this nature.

For more extended information on collecting and preserving mollusks the reader is referred to the following paper in which there is, also, a bibliography of other papers relating to this subject.

Preparing collections of the Mollusca for exhibition and study. By Frank C. Baker. Published in the Transactions of the American Microscopical Society, Volume XL, No. 1, pages 31 to 46, 1921.

ON COLLECTING FRESH WATER MUSSELS

By Henry van der Schalie

Articles dealing with collecting and preparing fresh water mussels for a cabinet have appeared from time to time in the past. Among the most informative contributors the following authors may be mentioned: Lewis (1866 and 1868), Wetherby (1882), Dall (1892), Call (1898), Walker (1902), Ortmann (1911), H. H. Smith (1912), and F. C. Baker (1921). Modern collectors follow more or less the general methods which were tried and proved adequate by their predecessors. In the following account a summary of the methods now generally accepted will be given and whenever possible suggestions will be made which might show improvement upon earlier techniques.

One of the first problems that confronts a collector is the selection of a suitable region in which to collect. In the United States we are fortunate because the Mississippi River and its major tributaries (the Tennessee, Cumberland, etc.) offer unusual opportunities for those interested in collecting mussels. No other region in the world produces as many species of naiades as are found in drainages of the eastern half of the United States. With the many good roads and the ready use of the automobile, regions formerly quite inaccessible are now open to those who find pleasure in gathering specimens and contributing to malacology. The best collecting grounds are found in limestone regions, but there are large portions of drainages in non-calcareous areas which are much in need of careful survey work. It should also be emphasized that many productive streams are being contaminated by man so rapidly that there is an immediate necessity for collecting in some places. It is important that a fauna be known before radical changes are brought about.

Mussel collecting is usually most successful during periods when streams are low. In this respect gathering naiades differs from land shell collecting. Generally there are certain seasons within areas when optimum field conditions exist. In the Great Lakes region low water stages are found in streams between August and October, and occasionally similar dry periods occur in May. In Alabama and western Georgia the dry seasons often appear during these same periods. Along the southeast coast, however, the hurricane season frequently brings torrential rains so that late spring is often the best time for collecting in the rivers there. In small tributaries these matters are naturally of least significance, but they are of greatest importance for work to be done in the larger rivers. Consequently, it is very essential for successful field work that one select a season within an area when the streams are at their lowest possible water level.

Mussels inhabit streams and lakes, but there are usually fewer species in lakes. With the exception of large lakes, such as Lake Erie, the number of species inhabiting a lake is directly proportional to the amount of stream influence in such a body. In other words, small land-locked lakes have fewer species than river-lakes. Rivers harbor many species, the number depending entirely on the physiographic province to which the drainage belongs. One may collect as many as fifty species of mussels from portions of certain streams in Tennessee, while similar bodies in Alabama and Michigan may yield only half that number.

In streams mussels are often found most abundant on shoals where they live imbedded in the gravel, sand, or mud of the bottom. There is usually a moderate current of water flowing across such shoals. The presence of dead shells along shore will often give a clue to the proximity of a shoal where collecting may be best. Also, in many places, the muskrats, raccoons, and mink gather mussels for food. These animals leave piles of shells at their feeding grounds. Such accumulations are signs that a good mussel bed is close at hand in the stream. Not only should one search the stream for live specimens but such shell accumulations as are left by muskrats are important sources for series of good specimens. Experience in collecting at kitchen middens of muskrats shows that those animals do not usually gather large specimens so that one should search in the stream for some of the larger naiades. Also, the thin-shelled forms, such as *Anodonta* and *Anodontoides,* are often broken by the teeth of the mammal. In any event, muskrats are usually good collectors and one may find species in their refuse piles that are not easily found when working on the shoal in the river.

Many methods are employed in gathering mussels. Perhaps the oldest and certainly one of the best is gathering them by simple hand picking. Mussels are very sensitive to pollution and silting so that usually they are common and readily seen in streams where the bottom is easily visible. At first it will take a little practice to see a specimen because the animal imbeds itself deeply in the shoal and often only the posterior siphons are visible. One soon learns to look for the little double-holed slit that appears on the bottom. This slit represents the siphonal openings through which the animal breathes and gets its planktonic food. It at once becomes obvious that ripples on the water due to wind or current as well as a lack of sunshine—factors that hinder visibility—at times make it almost impossible actually to see specimens studded in the bottom of a stream. On this account it is often advisable to carry a small rake with which to rake over the gravel and sand of the bottom. In such an operation it is usually best to move in an upstream direction as one collects on shoals. The current will then carry away any suspended matter caused by raking and the shells which have been uncovered can then be readily seen. Raking uncovers many small specimens which might otherwise be overlooked. The use of a small hand sieve is also recommended because by sifting samples taken from the bottom at various places on the shoal very young specimens showing details of beak sculpture are more readily available. Such minute forms are best preserved in vials containing seventy per cent alcohol. To overcome poor visibility in recovering small shells from the bottom, a glass-bottom bucket is often indispensable. There are some refinements of this aid in overcoming the bad effects of ripples, reflections, etc. but the glass-bottom bucket is simple to make and quite efficient.

Where shoals occur in deep water it is often necessary to use a small hand dredge or a set of tongs. Such equipment, although very desirable, is often cumbersome to carry and may be omitted from the list of equipment actually necessary to one with only a general interest. There are, of course, regions where dredges or tongs are entirely indispensable. A few years ago while surveying the Ogeechee River in Georgia it was found that the lower portion of that river was so deep and the water so colored that one had to rely entirely on a dredge operated from a boat to obtain an adequate series of mussels.

Another comparatively recent addition to the equipment of collectors is the diving helmet. There are a variety of these, but fundamentally they work on the same principle. Such helmets simply permit one to work at ten or fifteen foot depths to great advantage. This apparatus was recently used in the Grand River of Michigan where clammers managed to clean out thoroughly pockets of shells not accessible to the craw-foot bars and similar equipment in use on that river. Essentially the diving helmet is merely an aid for the hand-picking method of collecting.

When specimens are gathered it is necessary to have a container in which to place them. Various receptacles are used ranging from a basket to bags or sacks. In our work we have found that home-made sacks of about a half bushel or bushel capacity were very convenient. It is always well to have a large sack because often one gets into a productive territory when small ones prevent the taking of adequate series.

After a sufficient number of specimens have been gathered it is advisable to go to a comfortable place along the shore where notes should be taken about the collection. The most essential features in the note-taking would include concise information giving: date and number of collection, name of body of water, distance and direction from nearest town, the county, and the state. It is well to add such ecological data as would aid in recognizing a similar environment at some future date. The amount and nature of the notes taken is entirely dependent upon the interest and aspirations of the collector. However, it is most important that at the time the locality data are written into the notebook one or more locality labels are inserted into the sack or sacks containing the mussels. Without adequate locality data specimens are virtually worthless. Consequently, one cannot over-emphasize the importance of accurate labels. Data should be written in pencil on a good grade of label paper. Remember that mussels are often dirty and wet so that an inferior label will soon become soaked and disintegrate leaving the collector with a serious problem of interpretation at some later time. If one does not plan to clean the specimens until a day or two later it is often well to place a small, numbered metal tag in the sack at the same time tabulating that number in the field notebook. Unless the shells are cleaned at once the top of the sack should be securely tied with string so as to prevent any mixing of lots while one is traveling from one station to another.

When collecting it is well to take large series if they are available. This is valuable not only because it gives a better appreciation of the range of variation of characters within species, but also because a locality which one year produces an abundance of shells may be quite depleted at some later time. Often one finds it difficult to be certain in the field whether a specimen is one common at the station or one not hitherto found. For that reason it is safer to take good series so as to be able to distinguish more carefully when the time for cleaning the specimens arrives.

On a regular collecting trip it often saves time to accumulate mussels for two or three days. In that way one can utilize good weather conditions to the best advantage. After several large lots have accumulated it is advantageous to stop at a suitable place for cleaning and labeling the specimens. The animals are most conveniently removed from the shells by boiling. One starts a fire or uses a camp cooker to bring a pail of water to the boiling point. While the water is heating the contents of a sack are spilled on an open newspaper. The mussels are then sorted roughly into a reasonable batch according to the size of the specimens. Large shells should be boiled separately from the smaller ones since the larger forms need to be heated longer before the adductor muscles relax. It is often most convenient to place the mussels to be boiled in a sack and then the sack containing those specimens is deposited in the boiling water. They should remain immersed until one observes that most of the valves are gaping. The batch is then removed and placed on another clean paper to drain and cool sufficiently so that the animals might be conveniently removed. Should one wish certain specimens for alcoholics it is best to select those before the lot is boiled because in the boiling process the specimens shrink badly and are not suitable for anatomical work. One should also be cautioned against too vigorous boiling should one wish to save pearls which are at times found imbedded in the mantle when the animals are being removed. Boiling water may destroy the quality of a pearl.

By experience it has been found advantageous to nest the shells of large lots just boiled and from which the animals have been removed. The process consists of simply placing larger shells on the outside with smaller ones nestled within the larger. Small sets are thus made, allowed to dry for a short time, and then each batch is wrapped in a piece of newspaper with an identifying label. These small packages are tied with string so as to keep label and specimens together. The small bundles thus made are then placed into a nail keg putting the heavier parcels in the bottom and the smaller ones towards the top. Crushed newspaper is placed across the top of the keg, a piece of burlap bag is stretched over this paper, the hoop is nailed in place, a label is written and placed on the container, and the keg thus prepared is sent to its destination. Many such kegs have been sent by Mr. Clench and others who use this method and where the specimens are packed tightly one seldom finds even a single broken specimen. At the nearest railroad station one can freight or express the kegs thus avoiding hazards which attend carrying accumulations of mussels throughout a trip.

At times only a few mussels are found at a station. It is a waste of time to prepare a pail of boiling water for small series. These can best be cleaned by the use of a thin bladed pocket knife. If one uses a thick bladed knife the delicate edges of shells are often broken when the knife is inserted in the central margin of the shell in the effort to cut the adductors. Following the insertion of the knife one first cuts the anterior adductor muscle and then slits the posterior adductor. The elasticity of the hinge will automatically open the shell so that the animal can then easily be removed.

If one wishes to have the valves of a recently cleaned specimen stay together with the hinge remaining intact it is advisable to tie the valves shut. This was formerly considered the proper way to prepare specimens and has some advantages. However, for a study of the mussels it is often an advantage to simply allow the hinge to dry in the relaxed or open position breaking the hinge later when the shells are placed into trays.

Washing specimens can best be done when one gets back from a trip. One lot, which constitutes all the specimens from one locality should be cleaned at a time. Most shells can readily be cleaned by the use of a stiff brush, scrubbing the valves under running water. There are, however, specimens that cannot be cleaned that way—particularly shells with iron oxide deposits and other incrustations that accumulate on shells of certain regions in this country. As a rule, specimens badly coated with such deposits clean more easily if placed in a solution of oxalic acid. The solution is made readily by adding a few oxalic acid crystals to some water in a pan. The disadvantage of this treatment is that a little of the nacre on the inside of the shell is often slightly broken down during the period when the incrustations on the outside are being dissolved and loosened. To clean the inside of the shell of the chalk one may apply a little dilute hydrochloric acid with an old pair of forceps and a small swab of cotton. A thorough brushing and rinsing should immediately follow this treatment. The shells after being washed are placed on a drying rack in cardboard trays.

Cleaning mussels has its rewards. One certainly finds far more character for identification among cleaned specimens as opposed to those coated with incrustations. In the past, specimens were subjected to a great variety of treatments in order to improve their appearance. Most practices of this kind are unnecessary and in some instances the shells certainly lose their natural appearance, particularly in cases where varnish is applied. Fats, grease and vaseline are recommended by some. If these are used very sparingly there is at times some small advantage in using them, but where they are applied too lavishly they make specimens obnoxious to handle and certainly do not greatly enhance their appearance.

Cracking among thin shelled specimens such as *Anodonta,* and even among some of the heavier forms (such as *Lampsilis ventricosa* and *Lasmigona complanata*), has been a serious problem in some instances. Although several methods are in use to prevent splitting, the problem has not been entirely solved. Clench (1931) recommends dipping specimens in a solution of paraffin dissolved in xylol. The xylol evaporates leaving a thin film of paraffin. In some instances this has proven advantageous but there are specimens that continue to check in spite of the paraffin application. Dall (1892: 40) recommends a small amount of vaseline which is rubbed into the epidermis to prevent cracking. Although both paraffin and vaseline are recommended there are opportunities for improvement in this particular problem.

A list of essential equipment for field work with mussels would include the following items:

- Field notebook
- Old newspapers for packing
- Small rake
- Tennis shoes for wading
- Nail kegs
- Burlap to cover kegs
- Nails for sealing kegs
- Labels and tacks for labeling kegs
- Vials containing 70% alcohol
- Field labels
- Pencils
- String
- Forceps
- Thin-bladed knife
- Bucket for boiling specimens
- Glass-bottomed bucket
- Collecting sacks
- Alcohol (70%) for preserving

The following brief bibliography may assist those who are interested in literature dealing with collecting fresh-water mussels:

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A Circular with reference to collecting North American Shells
Smithsonian Misc. Coll., Vol. 2: 1-4.

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Smithsonian Inst. Ann. Rpt., for 1866: 389-94.

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American Naturalist, Vol. 2: 410-20.

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Instructions for Collecting Mollusks, and Other Useful Hints for the Conchologist
Bull. U. S. Nat. Mus., No. 39: 1-56.

1900 Call, R. E.
A Descriptive Illustrated Catalogue of the Mollusca of Indiana
24th Ann. Rpt. Indiana Dept. Geol. and Nat. Resources for 1899 (1900): 342-44.

1902 Walker, Bryant
Hints on Collecting Land and Fresh Water Mollusca
Journ. Applied Microsc. and Lab. Methods, Vol. 5: 1854-61.

1911 Ortmann, A. E.
A Monograph of the Naiades of Pennsylvania
Mem. Carnegie Mus., Vol. 4: 281.

1912 Smith, H. H.
Directions for Collecting Mussel Shells
Ala. Geol. Survey, Museum Paper No. 3: 9-12.

1918 Harmer, S. F.
Instructions for Collectors No. 9 Soft Bodied and Other Invertebrate Animals
British Museum of Natural History.

1921 Baker, F. C.
Preparing Collections of the Mollusca for exhibition and study
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1931 Clench, W. J.
A Preventive for the Scaling of the Periostracum. Nautilus, 45: 30-31.

LAND SHELL COLLECTING

BY WILLIAM J. CLENCH

Land shells may be found nearly everywhere that there is some sort of protective cover. Conditions, of course, vary a great deal and one must study those conditions that are the best for mollusks in any given locality. Experience, however, will prove to be the most important factor associated in the collecting of land shells.

A few general hints can be given that may possibly aid the beginner. Lowlands along streams and lakes are generally found to be excellent as long as the area is above the flood line. Shaded areas of ravines where there is ample ground moisture and leaf cover are apt to be very good. Land shells generally shun exposed situations that are excessively dry during portions of a season. A good line of reasoning is to attempt to visualize the seasonal conditions that any one locality must undergo during the year.

Under bark and along the edges of logs and fallen trees usually lead to good "pickins." Also under stones and rocks that are not deeply imbedded in the soil. We have also found fine collecting, particularly in the middlewest, on the forest floor in heavy and well shaded deciduous forests. Pasture land, not only the open country but even where there is forest cover, usually is poor unless there are plenty of logs to investigate.

Mountainous country, when there are limestone ledges, is usually rich in land snails. This is especially true if there is ample shade and plenty of moss and dead leaves at the base of these ledges. During wet weather, however, the snails will crawl to a limited extent over the wet rocks.

An ample supply of vials and cloth bags should be carried in the field. Large shells can be placed in bags and, if at all numerous, should have a generous mixture of leaves and grass to prevent their fouling one another. Small shells should be placed in vials for safe keeping. All mollusks that are to be preserved for anatomical purposes should be drowned in water for 8 to 10 hours and then placed in 60% alcohol. If the radula alone is to be studied, any strength of alcohol can be used above 60%.

If the shells are to be cleaned for the cabinet, they may be boiled and then extracted with a hooked safety pin. Shells from ¼ to ½ inch should be boiled ½ minute and for 1 minute up to the size of 1½ inches and larger.

Small land shells are best cleaned out (after boiling) by a strong force of water. The simplest procedure is to use an ear syringe, forcing the water into the aperture, the operation being carried out in a pan of water. For very small shells a capillary tube can be made readily out of a small piece of glass tubing and then attaching a rubber bulb.

Adequate data should be kept of all stations. The best method that we have found is to maintain a field book with a continuous series of field numbers. Each station receives a number and under it is recorded the locality, as precise as possible, the date and the general conditions that best describe the locality. To this, of course, may be added a list of the species obtained. The shells themselves should be fully labeled with the number, locality, date, and collector. The field number will lead back to other data in the field book when needed.

On expeditions or trips away from home it is wise to double the field book entry by using carbon paper, the carbon copies to be mailed home. Field books have been lost!

The above instructions are only of a general nature, and plenty of exceptions will be found after a short field experience. This experience will vary as different types of country are investigated.

Specific information relative to regions or to methods used can be had from workers in our museums as well as from the many private collectors throughout the country.

SHORE AND SHALLOW WATER COLLECTING

By B. R. Bales, M. D.

In no other form of mollusk collecting is there need of so many different tools or implements, and, while a student may achieve a measure of success with no equipment whatever, he will eventually find that many specialized tools will be necessary as he progresses in the study of marine malacology.

Probably the most useful tool, and one that will be used day after day if given a thorough trial, is a hook made from ⅝″ metal. An old Ford brake rod is ideal. This hook should be of a length convenient to the collector's needs and should be the same length as a walking stick. Any blacksmith will make one. The point should be sharp, and a handle should be made at the other end by bending the metal into a loop or hand-hold. Three or four inches above the point, a curved hook, also pointed, should be welded on so that the finished product is in the form of an elephant hook with an elongated handle. This tool is conveniently used as a cane when walking the beaches; is handy to turn over shells or small rocks seen through the water-glass or to turn over shells on the beach without stooping; may be used to draw objects to the collector; is fine for a snake weapon when hunting in the jungle or hammock; may be used effectively to bring down a branch on which a Liguus is resting to convenient reach, and is an all-round efficient tool. Be sure to paint it red, orange or other brilliant color so that it may be readily found should it be dropped in water or jungle. Hooks soon become rusty and the color blends with soil or sand, but if painted, they are readily located.

To collect the smaller specimens from shallow water, it is often necessary to use a screen, and these may be made in many sizes and forms. If an oblong screen is used, it should be not less than 22 inches long and 12 inches wide; if it is a square one, 18 inches will be found convenient. The sides should be from 3 to 5 inches in height. However, the size of the screen depends upon the individual user, and it should not be so large that it taxes the strength, for it should be remembered that to be successful in screening, the collector must be persistent and many hours are usually spent in this manner. It is a fascinating form of collecting and the time flies all too soon. Seldom will the collector stop sifting without trying "just one more screenful" of material. Some collectors prefer several graduated sizes of screen wire cloth, but most prefer just two; the inside screen to be ¼ inch mesh and the outer one of ⅛″ mesh. The inner screen with the larger mesh should fit snugly into the outer one with the smaller mesh, but not too snugly, as allowance should be made for the natural swelling of the frames, although much swelling will be avoided by painting the frames. Some collectors nail a small cleat to the ends of the outer screen to obtain a firmer grasp, or the same results may be obtained by sawing a narrow horizontal slit in the end of the frame. The size of frame and mesh being of individual preference, it is sometimes advisable to try out several before the ideal one is found, and even then, many collectors change from time to time as the occasion demands.

One form of screen that is sometimes used has no upright frame on one side and is held in place on the ocean floor by the collector's foot. The sand, mud, marl or other material, is raked or drawn into the screen by the use of a hoe, rake or other utensil. This overcomes lifting the material and depositing it in the screen. To fill the screen with material, various tools are used, such as a trench shovel, a sheet iron cylinder with a hand hold rivetted to the side, a hoe and even a tin can.

An important adjunct to shallow water collecting is the water glass or water bucket. The original of this device is the bucket with a glass bottom used by sponge fishermen. Collectors adopt the same principle, but use one that is square or oblong. An easy way to construct one is to make the frame or box of not too heavy wood and fasten the glass to the open bottom by means of quarter rounds available at any lumber yard. These should be coated with white lead before nailing on to make it water tight. The inside should be painted dull black. When in use, frequent wetting of the inside of the glass makes vision clearer and an occasional application of Bon-Ami will brighten up the glass wonderfully.

While collecting small species, a pair of spring forceps is a necessity, for small shells like *Caecum, Rissoina, Cerithiopsis,* and the like, are too small for the fingers. Be sure to have a string tied to the forceps, and fasten the string to some part of your clothes, and have sufficient length of string to permit free use of the forceps. Being small, forceps frequently are lost and prudent collectors (especially if they have lost a pair or two) never fail to use a string.

One of the most useful things to have in the collector's kit is what is known as "cops." This is a compact roll of rather loosely spun cotton thread, and thousands of yards are contained in a single roll. It may be obtained from any dealer in collectors' supplies. For holding bivalves together, for tying small Chitons to drying boards and in many other ways it will be found handy and inexpensive.

For the smaller varieties of Chitons, nothing better can be found on which to stretch them while in the process of drying, than the common wooden tongue depressor found in every physician's office, though some collectors favor the use of narrow strips of glass, maintaining that the Chiton slips into the desired position more easily by reason of the smooth surface. These collectors usually use narrow strips of cloth instead of cops to bind the Chiton to the glass. For larger Chitons, lath or other flat wooden pieces should be employed, and it is not well to remove the specimens until fully dried. If it is desired, the bodies may then be removed from the shelly plates. In some instances, the bodies of the larger Chitons are removed as soon as the specimen is taken, using a sharp knife, and the specimen is placed at once upon the stretching board. In case this is impractical, as soon as the collector can conveniently do so, the living Chiton should be placed in a vessel of sea water and set aside.

Eventually most specimens will uncurl and they may be placed upon the stretcher and tied firmly with string. The smaller Chitons may be brought back in vials of sea water and mounted on the stretcher at the collector's convenience. Smaller Chitons may be removed from the rock with the blade of a small pen knife but with the larger ones, a heavier knife is necessary. If the collector is observant, he may determine which end of the Chiton is the head, and apply the knife at the OTHER end. They are much easier to remove from the rock in this manner. Chitons are unusual mollusks and certain procedures which might achieve results with other mollusks do not seem to apply to them. For instance, should the collector desire to study the living mollusk in action, it is advisable and necessary that the vessel in which it is confined be kept absolutely quiet. To those who have patiently (more or less) waited for a frightened Chiton to unroll so that it might be placed upon the stretching board, and have been exceedingly careful that the specimen be undisturbed, it will be good news to learn that if the vessel containing the specimens be gently tipped backward and forward so the specimens are caused to roll about, in a surprisingly short time, every uninjured Chiton will unroll and attach itself to the bottom of the vessel and it can be easily removed and placed upon the stretcher.

Hooks useful in drawing the bodies from small shells may be made by whittling small cylindrical handles from some soft wood, making them 3 or 4 inches long and the diameter of a lead pencil. Into this handle push a needle (with the eye downward), leaving the point out. This point may be bent to any degree of curvature by heating over a Bunsen burner and bending while white hot. Some collectors achieve excellent results while using a piece of the fairly stiff springy wire used as a leader on fishing lines and there are many beautifully prepared specimens where the only tool used was a safety pin with the point bent into a hook. Many collectors use hooks on but few occasions but resort to the use of a syringe to clean out the shell. The best syringe to use is the one used by dentists and is of the piston type, but the common rubber ear syringe may be used. This does not give nearly the amount of force, but is much less expensive.

A useful device for collecting Cyphomas consists of a child's toy rake, to be obtained at any ten cent store. The teeth of the rake are bent inward on a curve and a small piece of screen wire attached at each side and at the back, thus forming a sort of basket with projecting teeth. By bringing the hook under a strand of Gorgonia on which a Cyphoma is resting, it may be hooked or scraped off and falls into the basket. By attaching a long handle to this device, it may be used from a boat in deeper water.

A supply of paper plates should always be on hand for convenient drying of specimens.

For removing the bodies from the larger Conus, it has been found that a common crochet needle is useful. The end should be slightly bent.

If rock dwellers are to be collected, a strong hammer and two or three chisels are needed. One that is 8 to 10 inches in length with a cutting edge of ¾ to 1 inch in useful when work must be done in shallow water. Usually most of this type of collecting is done at low tide when the rocks are bare of water. When this condition obtains, a chisel that is 5 or 6 inches long with a cutting edge of ½ to ¾ inch is one that will be most frequently used. When really delicate work is required, one with a cutting edge of ¼ to 3/16 inch may be used.

When the ocean floor is of rock that is more or less honeycombed, and with small pot holes, it is surprising what fine specimens of the smaller varieties may be obtained by the use of a common bilge pump which is standard equipment on small boats. The end of the pump is placed in a sand-filled pocket in the rock; the sand as well as the mollusks that have taken refuge in the hole are pumped with the water into a screen; the sand and water flow through, leaving the specimens all ready for the collector.

A handy device often used consists of a small round sieve which has been attached to a long handle. They are easily made from a 5 or 6 inch gravy strainer to be had at most ten cent stores. They have two bent prongs, in front which must be bent backward so as not to interfere with the use of the net. No device equals this when working in waist or chest deep water.

Freshly taken specimens should never be placed, even temporarily, in a rusty metal container or in contact with rusty chains or other rusty objects for it is remarkable how soon they will become rust stained, and it is almost impossible to remove this stain.

During the past few years, mollusk traps have been used to take many of the carnivorous mollusks and reports from those who have used them have been very optimistic. Some of the older collectors reported success with this type of mollusk by simply placing a piece of meat or a dead fish between two sheets of wire mesh and weighting them down with stones, overnight.

To one who has never collected at night, hunting by the aid of artificial light is a revelation. Many mollusks that are rarely encountered in daytime may be simply swarming at night. This is particularly true of Marginella, Cypraea, Hydatina and the like. While specimens may be taken by the combined use of water glass and flash light, the ideal light is provided by a gasoline lantern whose asbestos mantle produces an intense white light. Two forms of these lanterns are being used and each has its advantages. The one with a single mantle is not heavy and gives a good light, but the lantern equipped with two mantles, though quite a bit heavier, gives a more brilliant light and also has a reflector which further increases its efficiency. The collector who has never collected at night has a thrill in store for him.

To attempt to do much shallow water collecting without first consulting the Tide Table would be the height of inefficiency, for all collecting of this type is dependent upon tide conditions, and where there is excellent collecting at a given place at low tide, it would be simply out of the question to do any worth while collecting at high tide. For collectors in the east, Tide Tables of the Atlantic Ocean and for western collectors, Tide Tables of the Pacific Ocean may be obtained by writing the U. S. Department of Commerce, Coast and Geodetic Survey at Washington and enclosing 25c for the Tide Tables of the current year. No active collector can afford to be without his tide table and it is confidently asserted that if most collectors would read their Bibles as frequently as they consult their tide tables, they would be more nearly spiritually perfect.

Probably as important a part of the collector's outfit as any is his game bag, and this may consist of almost anything from an old tin can, a salt sack, a pocket handkerchief or some such makeshift affair, to a real game bag. They are usually made from light canvas and carried in some cases by a strap over the shoulder. Such bags are useful when extra heavy specimens are anticipated, but it is found that a bag that may be tied or secured about the waist is much handier and has the advantage of always being in place and does not drop in front of the collector when he stoops to secure a specimen. Many collectors favor a bag having a dividing partition. In one compartment may be carried tools, vials and other equipment apart from the shells that are collected.

There are other methods of "bringing them back alive." One active and very efficient collector uses a wide-mouthed flat bottle, such as a pickle bottle which he carries in his hip pocket. The bottle is filled about one third full of water which acts as a cushion when shells are dropped into it. The bottle is not removed from the pocket at any time while collecting, is in an upright or semi-upright position at all times and can be carried open without spilling. This method is used for such shells as are too large for the vials and too small to be mixed with the larger ones in the game bag. It is a very convenient procedure, especially while sifting when both hands are busy with the screen.

When collecting the smaller mollusks, it is convenient to be provided with a number of small vials. These should be cylindrical and of the screw top sort without a narrow neck. Many medicines come in this sort of vial and there should be no trouble to secure a supply.

When collecting *Barnea costata, Ensis directus* and possibly other similar bivalves, it is well to have a bucket of sea water at hand in which to place the specimens as soon as secured, for it is not uncommon for these to contract their muscles with such force as to fracture the shell. Placing the specimens in water immediately seems to overcome some of this, but even when all precautions are taken, some are broken in this manner. As *Barnea costata* is usually found in colonies, very frequently where there is a mud bottom, digging out the first specimen or two causes the water to become so muddy that further collecting is out of the question as the burrows cannot be located. In such cases, a good plan is to secure a supply of small switches from some nearby trees and place a switch in each burrow as it is located and not to start digging until all desired burrows are marked; then the collector may proceed from one switch to another and be able to locate as many specimens as he desires to collect.

Before leaving the subject of collecting, it is well to emphasize one point that possibly does not come within the scope of this paper, but shell students should be impressed with the fact that they should leave the ocean floor or wherever they have collected as nearly as possible in the same condition as when found. Nothing indicates the thoughtlessness of a collector more than to follow in a day or two or frequently months where some one has recklessly turned over rocks, leaving their bare and bleached portions exposed where it will take many more months for them to be covered by the natural growth necessary to the maintenance of molluscan and other marine life.

After the mollusk is collected, the problem presents itself as to the best method of preserving it; and the ways are many and varied. A great number are cleaned by simply boiling them and removing the animal, but care should be exercised in bringing the animal out with a circular or corkscrew motion; in other words it should be twisted out and with larger specimens such as *Fasciolaria, Busycon* and the like, an ice pick driven into the body will give a firm hold where it is most needed. Never boil too great a number of shells, other than bivalves, at one time as the bodies are much more easily removed while hot, and shells that have been boiled and set aside for a period and have become cold are hard to clean by reason of the contraction or shrinking of the bodies. The liver and other parts of the viscera are often left behind to make themselves very evident at a later time. Very few Murex or Vasum are perfectly cleaned, as they seem to have a weak connection between the muscular part of the body and the viscera; usually there is a break at this point when drawing the bodies, leaving portions that are next to impossible to remove.

A few drops of formaldehyde introduced into the shells will eliminate bad odors. It is a good plan to plug the apertures with a wad of cotton for obvious reasons.

When a crop of Janthinas is thrown upon the beaches and the bodies are still in the shells, it is well to place the specimens in fresh water over night and the bodies may be syringed out the following morning. Janthinas should not remain in fresh water for more than twelve hours, as a longer immersion will soften the periostracum in an irregular manner and the dried shells will present a blotchy appearance.

Removal of the body from *Xenophora* is almost impossible and boiling does not solve the problem. Frequently if the shell is placed with the aperture upward, the animal will thrust a greater part of its body out and it may be quickly removed, but in small specimens of this interesting shell, a needle or pin is thrust through the body just back of the operculum and allowed to lie crosswise of the aperture, the animal will quickly die; then a small amount of formaldehyde introduced into the shell will preserve it.

For years it has been the belief that no Cypraea should be boiled. It was thought that heating the shell would impair the gloss and the accepted procedure was to allow the animal to die and decay; eventually with many rinsings, the odor would be removed and the shell allowed to appear in respectable company. It has been demonstrated that the idea was fallacious and most collectors do not now hesitate to boil a Cypraea, but it has been recommended that the specimens be placed in tepid water and then brought to a boil, thus avoiding any checking of the shell due to sudden change of temperature. It is important after boiling the larger Cypraea that the shells be shaken vigorously to loosen the body of the mollusk and it should be shaken until the loosened body may be heard swishing about. All moisture should be removed from the shell as any remaining moisture will cause a bluish discoloration in the darker colored species and this discoloration is usually permanent.

With the larger *Cassis,* another procedure is necessary (and this has been adopted with the larger *Fasciolaria, Busycon* and the like). The shell containing the living mollusk is placed, aperture side up, for twenty-four hours or longer. Usually by this time the animal has become weakened and a greater portion of it lies out of the shell. A stout cord or wire is tightly wound about the body, just back of the operculum and then is tied to some convenient object so that the shell is suspended with all the weight pulling downward. Gradually the body is pulled from the shell by the shell's weight. A bed of soft material should be placed beneath the shell to prevent breakage and frequently the cord must be shortened from time to time as the body becomes more and more elongated from the constant traction.

A method of cleaning long in use by the Florida commercial shell collectors has recently been published, namely, the use of blow-fly larvae or maggots. This method, while repulsive, is very efficient and after a period of time, vigorous rinsing of the shell is all that is necessary.

Preservation by means of alcohol is usually adopted with many of the smaller species and many are placed in this preservative immediately, but it is well with the smaller operculate shells that they be allowed to remain out of water until death occurs and then placed in alcohol before decomposition sets in. By so doing, the opercula are preserved in plain sight. Should these be placed in the preservative before death occurs, the animal retracts within the shell and the operculum cannot be seen in the prepared specimen. The specimens should remain in alcohol for at least twenty-four hours if small and longer for the larger ones. After removal, the fluid should be drained from them and they be allowed to dry for at least a week before packing them away.

Larger bivalves, such as *Pinna, Arca, Lithophaga,* in fact all of the larger ones, should be boiled and the soft parts removed; even such as *Yoldia* and the smaller *Tellina* should be cleaned in this way.

There is a diversity of opinion regarding the position in which bivalves should be dried. Many favor closing the valves in a natural position and holding them in place by a few strands of cops wound about them until they are dry, but others prefer to dry the specimens, wide open, "butterfly fashion;" maintaining that the beauty of the shell is enhanced and the inside structure more easily seen and studied. Individual preference should be the guide.

If there is one procedure that will make the average collector use Biblical terms, loud and long, but in a different juxtaposition from those in Holy Writ, it is the practice of holding the valves in position by means of narrow strips of surgical adhesive plaster. The rubber coating of the plaster eventually separates from the fabric and adheres to the shell. It is hard to remove and the collector who adopts this procedure is roundly damned but NOT "with faint praise."

If it is desired that specimens of *Pteria, Anomia* and the like be preserved on the Gorgonia or other object on which they have been found, they should be placed in alcohol for a day or two and then dried "in situ."

Pododesmus should be left as found, as any attempt to remove the animal portions will prove disastrous. The animal is so small that it will not make itself unpleasantly evident and will dry up.

Dentalium, Rimula and the like are left over night in fresh water and the animal easily removed the following morning.

With *Cyphoma, Marginella, Oliva, Olivella* and *Trivia,* it is necessary to kill the animal with fresh water; and they should remain in fresh water for at least forty-eight hours, with two or more changes of water before the body is sufficiently softened so that it may be removed with the syringe. It might be mentioned that if the shell to be cleaned is held under water during the operation, the collector will obviate all danger of spraying his features and anatomy as well as all adjacent territory with none-too-sweet-smelling water.

The larger *Conus* may be boiled and the animal removed, using a straight wire or, as previously mentioned, a crochet hook which has been slightly bent. The wire should be introduced parallel with the long axis of the shell. A firm twist will usually start the body rolling out.

Be sure to preserve the operculum of every specimen and see to it that each shell has its own operculum. Place the operculum within the shell and close the aperture with a pledget of cotton or small wad of crumpled paper. Later, when preparing the shells for the cabinet, a tightly fitting pledget of cotton wedged into the aperture will receive a drop of Duco on which the operculum is placed and pushed into position in a life like and natural manner.

In case it is desired to preserve the specimens entire, alcohol has a decided advantage over most preservatives, especially when the animal is to be used for future dissection and study of molluscan anatomy. It is very easy to lose the identity of soft parts while preparing shells, so it is well to label each specimen at once. Ordinary bond paper on which the name is written with lead pencil is very satisfactory and may be affixed to the specimen with a short length of thread or string. It is a simple matter for the collector to preserve the bodies in alcohol. These bodies are usually thrown away, but many museums will be grateful for such material sent them. In this manner, the amateur collector may, in a small way partially pay for the large amount of free, unselfish and efficient help given by these institutions.

While many collectors prefer specimens just as taken from the water, many are more fastidious and try to enhance their beauty by cleaning off all extraneous matter and it is often surprising how much "beauty is only skin deep." Removing the periostracum often brings to light much hidden beauty. A common vegetable brush is useful in cleaning specimens, but if the offending growth is very persistent, a wire brush will often accomplish results. However, there will be many specimens where it will be necessary to resort to harsher measures. Where there is a quantity of coralline or calcareous growth, it is necessary to remove this bit by bit and very carefully so as not to injure the shell. A shoemaker's awl is a very efficient implement, but any sharp pointed instrument will do. Some use a small tool used by dentists. Often it is necessary to resort to the use of muriatic acid to facilitate the removal of these limey deposits and "thereby hangs a tale." What follows will be regarded by many as pure heresy and the advice is offered with a "take it or leave it" clause attached. There is no doubt but what a certain amount of the delicate part of shell structure is injured by the use of acid, but if the collector is EXCEEDINGLY careful, very little damage is evident except by the use of a magnifying glass. Many fastidious collectors prefer the slight damage rather than the rough, uncouth natural specimen. Any advice given regarding the use of acid should be taken only if the collector is willing to sacrifice certain portions of the shell structure. My method has been to use the acid, full commercial strength. The acid bath is close to a faucet of running water. The shell is held in forceps and quickly dipped into the acid and immediately into the running water. If necessary, another dipping may be tried and results noted. Often more chipping with the awl will remove a quantity of the lime that has been loosened by the acid.

Especially hard to clean are shells more or less disfigured by an unsightly mass of barnacles. Often by applying pressure at just the right point with the cleaning tool, the mass may be detached in its entirely, but all too frequently this is not the case and an unsightly white blotch is the result. This may usually be removed by carefully scratching the remains of the barnacle with the tip of a sharp pointed knife and reducing the remains of the barnacle to a powder; care being taken not to injure the shell.

Shells that are covered by a mass of vegetation or spongy growth may be readily cleaned by immersion in any of the chlorine solutions found at most grocery stores. No fear for the integrity of the shell should be entertained, the chlorine will not attack the lime of the shell, but the specimen should not be allowed to remain in the solution for too long a time, as some loss of color through bleaching may occur.

Often shells that are more or less rare are found washed up on the beaches and are dull and very dead looking. Until they may be replaced by living examples, the color may be greatly intensified by a mild application of some greasy substance such as vaseline or other mineral fat. Application of some of the liquid wax preparations will often brighten up a dull and faded specimen.

To preserve the periostracum of such shells as *Sinum* and *Hydatina* which have a tendency to peel when very dry, an occasional application of wax or vaseline will prove efficient.

It is very important to remember that the collector is not creating a shell but is simply, in a manner "lifting its face" and we often see specimens that have been killed by kindness; they are over cleaned and practically worthless. The method of dipping in hot acid followed by a plunge in ice water so as to create a false lustre is to be avoided like the plague and is worse than trying to gild the lily. The same may be said of the use of varnish or shellac.

When a person takes the infinite pains and time to prepare his specimens properly, he can truthfully say that the collection is "a thing of beauty and a joy forever."

DREDGING FOR EVERY ONE

By Tom Burch

I suspect that almost every shell collector who has gotten up at an unearthly hour in the morning to collect at a minus tide has gazed out beyond the narrow bend of shore left uncovered by the retreating waters and wondered what rare treasures he could find if the sea would but drop a hundred feet or so for awhile. Or what shell collector strolling along the beach after a storm hasn't wished that he could go out beneath the waves and collect live, perfect specimens of some of the shells that lie broken and worn at his feet? The vast majority, however, just sigh and decide that the "deep stuff" can only be collected with complicated and expensive equipment and is only for institutions and individuals with plenty of finances. A few consider it further and decide that while it would be much easier and more pleasant to dredge from a two-hundred foot cruiser with power winches and a crew to do all the work, if one has a strong back and a few dollars he too, can get some of this same material.

Whereupon the ambitious collector makes a triangular or rectangular iron frame with a row of holes along one side, or gets a blacksmith to make one for about fifty cents, and gives a friendly fisherman fifty cents for some old fine-meshed fish net. On the way home to sew the net onto the frame, he stops at a hardware store and buys about 200 feet of 3/8″ manila rope for two or three dollars. Then, taking this simple equipment and some containers for the catch, he goes to the beach, rents a skiff for a few hours, rows merrily away from piers and boats, and begins to dredge. A few hours later, depending on the physical condition of the dredger, the ambitious collector returns wearily to shore, a tired but happy person who, in a couple of hours, has collected more different kinds of shells that are new to his collection than he had dared to hope.

I must hasten to say that it does not always turn out as nicely as I have perhaps led my readers to believe. The spot chosen in which to dredge makes a great deal of difference. Some who would have become ardent dredging fans have given it up as a bad job after they tried to dredge in a shallow mud slough and got nothing but barren gooey mud, or after they tried to dredge among large rocks and got nothing and perhaps lost their gear. If the embryo dredger is persistent, however, and not easily discouraged, he will continue, profit from his mistakes, and in time become quite adept at this mode of collecting. Incidentally if he does continue to dredge, he will soon have many species of shells that less fortunate collectors can never get except by trading, buying, or going dredging themselves.

Boats

While it is sometimes possible to get some very good material by just throwing a dredge off from the end of a pier and dragging it in, a boat of some sort is really essential. I have already suggested that a person with a strong back can dredge a lot of fine material with a skiff. My readers will probably not believe it until they have the experience, but a man can drag just as large a dredge and fill it just as full by rowing as one can with an ordinary small motor boat. Needless to say, the rower will not be able to make as many hauls as the motor boat operator.

In choosing a dredging boat the most important item to consider, in my estimation, is seaworthiness. If one is going to dredge in the open sea with a small boat, he must always remember that the wind and the sea are treacherous, and if his boat swamps he is in a mighty precarious position. Incidentally in such a case the safest thing to do is to stay with the boat (unless it sinks). If you are going to dredge with a skiff or flat bottomed rowboat, be sure to get one that was made for the ocean and not for some quiet lake or lagoon. It should have a fairly wide beam so that you can stand up, if needs be, without tipping it over, the sides and stern should flare a little and there should be some shear. If you have never rowed a boat learn how to, first. Have some old "salt" show you or read how to, in a book. Also, do not try to dredge everything the first day, leave some for other times or your hands will look worse than hamburger, even if you wear gloves—which good oarsmen never do.

The next step above rowing a skiff is to power a skiff with an outboard motor while dredging. Choosing the outboard motor presents quite a task, especially if you have to keep your hobby within a narrow budget. I can tell you from experience, however, that it is better to pay a little more and get a good dependable (as outboard motors go) motor and then take good care of it. I shall never forget the hours that I have spent trying to start, taking apart, and then putting back together again the cheap little outboard motor with which we started, nor shall I forget the miles that I rowed when I did not get it started.

It is rather important to match the motor and the boat; if the motor is too small for the boat, you will have to help it out with the oars, while if it is too big, it is likely to push the stern under the water when the power is turned on.

After trying out many different kinds of boats, I believe that the one that we have used for the past three years is the best for ordinary dredging—within its price field. It is an eighteen foot New England dory with a "well" for an outboard motor and a shive or pulley in the stern. The "well" is so arranged that one person can sit behind it and tend the dredge. Forward of the motor operator's seat is a hand windlass on which the line is wound. We had the hull built for $100 and the motor which I am now using is a 10 horse power Johnson outboard which sold new for $180. Let me say right here that the only advantage of a 10 h.p. motor over a 5 h.p. motor is that you can go faster from one place to another and thus extend your field of operations, but you cannot get any more in your dredge, or if you do, it is apt to stay on the bottom.

Even though there is never enough room on a small dredge boat, I would recommend that your boat be equipped to sail. I would also advise that you learn to sail it before your motor fails during a heavy sea, and you have to. The narrow stern is about the only drawback to a dory as a dredging boat. However, it's redeeming features of seaworthiness and adaptability more than make up for the cramped quarters.

One very great advantage of a dory using an outboard motor over a boat using an inboard motor, is that you can always take the motor out, land through the surf, put the boat on a trailer, take it somewhere else, launch it through the surf, and dredge there.

There is no doubt about it, power boats with inboard motors are by far the nicer to dredge with—especially if they have a power winch to pull up the dredge. However, here even more than with rowboats, be sure to get a seaworthy craft, as you are likely to wander miles from shore and possible aid.

If the boat is large enough it is advisable to rig some type of derrick or frame on the stern to facilitate getting the dredge aboard.

Dredge Line

The simplest type of dredge line is rope. Some prefer to use ½″ or ⅝″ manila rope as it is large and easy on the hands. This is very good if one is dredging on a shallow, rocky, or shale bottom and does not get it permanently fastened to the bottom. This heavy rope, however, is too bulky for anything but very shallow dredging (5 to 20 fathoms) and is also much more expensive than the smaller rope which is just as good and sufficiently strong. My father and I have dredged in as deep as 50 fathoms with ¼″ rope by fastening small weights to the rope at several places. These weights are necessary in deep dredging with rope as it has a tendency to float and pull the dredge off the bottom.

If one tries to dredge in more than twenty fathoms with rope, it is necessary to devise some sort of windlass on which to wind the rope. If you do not use a windlass, it always seemed to me that the rope becomes more tangled when an attempt is made to coil it when dragging in the dredge than if simply allowed to fall naturally. If you buy a full coil of rope as it comes from the manufacturer, be sure to ask the dealer the correct way to open it and take out the rope, as it will be full of kinks (one for each coil of rope) if not done correctly. Incidentally if this should happen, pull in the rope, stick the end up through the hole in the center of the coil and pay it out from there. This will remove all of the kinks and the rest of the rope will not be kinked.

If you are going to dredge very deep (50 fathoms or more), it is much more convenient to use cable, as rope has a tendency to float and pull the front end of the dredge up. The chief objection to cable is the cost. A thousand feet of good cable probably would cost about $100. We have gotten around this difficulty very nicely by using twisted wire clothesline which costs about $10.00 for a thousand feet. This "cable" is good for only one season, or if a great deal of dredging is done, only a part of a season. There are two types of this twisted wire clothesline, one of which has a string down the middle (also called sash line). This is much more flexible than the other, but will not last as long. It is best to keep the cable oiled with heavy oil or grease.

Needless to say, a windlass or winch is necessary if cable is used. If your boat is large enough, connect the winch to the motor. If not, crank it by hand.

Types of Dredges

Dredges can either be very elaborate or very simple. It is possible to make a dredge that will work, from a five gallon oil can or a piece of iron sewer pipe. These are not as practical as others but can be used in a pinch. Every person that has done very much dredging has his own ideas as to the best type of dredge. Probably the most universally used type consists of a rectangular iron frame with flanging (not very much) cutting edges and iron bridles which are tied together. A fine-meshed fishing net is sewn to the iron frame and a heavy canvas sheath over the net. The end of the net is tied shut instead of sewed, so that the material can be removed from the back.

We have had better luck, however, with a triangular dredge and metal net. These are made with two triangular iron frames connected with iron bars at the apices and a copper screen for a net protected with ¼″ hardware cloth. The advantage of this dredge is that the maximum cutting edge is always on the bottom and when it is brought up, the material can be screened before removing it from the dredge instead of after it has been hauled into the boat and dumped.

Probably the most efficient cheap dredge consists of a triangular, circular, or rectangular frame with fish net or hardware cloth for a bag. A dredge such as this can be made for less than a dollar.

While the dredge can be considered the standard implement for obtaining marine life from the bottom of the ocean, various other gear, such as trawls, tangles, etc., can be used with success. While there are many different types of trawls, I will only describe a simple beam type that I have used with good results. It consists, briefly, of two iron runners connected to a wooden beam. The size depends on the power of the boat that is used to pull it. A long net is fastened to the beam and the rear end of the runners. The amount of sag to the lead line which drags on the bottom is very important. If it is too little, it digs too much, while if it is too much, it rolls over the material. The right amount must be determined with experience. In addition to a few lead sinkers along the lead line a heavier weight at each end of the line on the runners will help the net stay on the bottom. A heavier net should be placed over the finer net for protection and the end tied shut and not sewed to facilitate removal of the "haul."

The trawl is used on a sand or mud bottom and is used to cover large areas. It only picks up the larger shells, etc., and lets all of the little things go through or under.

Tangles are especially useful on rocky bottoms where it is impossible to use a dredge or a trawl. They may be used, however, on any type of bottom. Tangles consist of a beam with a few short pieces of chain to which is fastened unravelled rope.

Dredging Operations

Probably no two persons who have dredged very much agree on just what equipment is best and how it should be used. My father and I have dredged together quite extensively for the past six years and *we* do not agree on the proper procedure so no one else will probably agree entirely with me or anyone else.

The principle of dredging is very simple—you merely throw the dredge overboard, let out about three times as much line as depth, drag it until it is full, pull it up and remove the contents. The only way to learn to dredge is to *actually go out and dredge.* You will soon be able to tell by the feel of the line if the dredge is on the bottom and digging; in fact, you will soon even be able to tell what type of bottom it is by the way it jerks. Mud hauls usually just get heavier and heavier, sand hauls have many little jerks depending on the character of the sand, while gravel hauls are decidedly jerky and very uneven. The deeper the water, however, the more difficult it is to tell anything about what is happening below.

It is very important when dredging with cable to keep the line taut by moving the boat forward from the moment the dredge is thrown overboard, otherwise the cable will get full of kinks and break easily. This is not so important when using rope, if one is careful to keep the rope clear of the propeller, but it is usually a good idea.

A weight of some sort should be placed between the line and the dredge to insure the cutting edge staying on the bottom. A three or four foot piece of heavy log chain is the most convenient kind of weight, but a sash weight, or anything else will do.

It is impossible to dredge except at very slow speeds as otherwise the dredge is likely to be pulled clear of the bottom. It is much easier to keep the dredge on the bottom when dredging uphill than down, in fact, if the slope is very marked, it is almost impossible to dredge downhill. The more line you have out the easier it is to keep the dredge on the bottom.

On dredges with iron bridles it is a good idea to make the dredge line fast to one bridle and tie the other to it with a cord. Thus if the dredge gets caught, the cord will break and the dredge will pull free. As an additional safeguard against breaking the dredge line, it is best to have some arrangement so that the line can slip out of the boat if the dredge gets caught. This is more important with a larger boat.

If you ever try to dredge on a shallow shale bottom and have difficulty getting anything because you get "hung up" on projecting pieces, try this trick used successfully at Monterey, California. Use heavy rope, ⅝″, and when the dredge gets stuck so that you cannot pull it off, open up the motor, slow down, take in about ten feet of slack, and then speed up again. If it doesn't break off the piece of shale that the dredge is caught on or tear the dredge to pieces after three or four tries, you had better pull it up, if you can. Back up and pull from the other direction, if you have difficulty getting it off the bottom. Occasionally it is impossible to get it loose, but in the end it is worth the trouble and expense.

Taking Care of the Hauls

When a dredge load is brought up, it should be screened. If the dredge is made of screen, this can be done before bringing it aboard. Otherwise the load must be dumped and screened with small screens. If this is not convenient, just empty the dredge into a sack and take it home to screen. Gravel and rocks should be taken home and washed through screens of varying meshes to separate the material according to size and thus make sorting easier.

The bottom off the West Coast is very spotted with small patches of very good bottom surrounded by large areas of poor bottom with relatively few shells in it. For this reason it is very important to keep track of the good hauls and the poor hauls. To do this it is probably best to keep each haul separate until it is dried and sorted. If several hauls, however, are from about the same spot and are apparently the same material, there is no use keeping them separate. After the material is dried and sorted it is up to the individual what he does with it.

We place everything from the same locality, approximate depth, and character of bottom together. Thus the material that we have dredged off Redondo Beach, California, is divided into 10, 25, 50, 100, or 150 fathoms; mud, sand, gravel or rocks depending upon which it is closest to. Each collector will have to make up his mind according to how much time he has for bookkeeping.

Unless you are not interested in the semi-microscopic shells do not throw any of the material away until after it is dried and re-sorted, as it is practically impossible to see while the material is wet. We usually screen the material, sort out what we can see readily, dry it and then re-sort it at our leisure. This latter sorting can even wait until winter if you are pressed for time.

I have suggested that it is a good idea to keep track of the good dredge hauls and the poor, so that you can later return and dredge more of the good material. However, finding the same place again is quite a problem. Trying to find a good dredging spot that you hit by accident is like being the blind man in "blind man's buff." When you get a good dredge haul be sure to take all possible bearings on objects on shore. Try to get two objects on a line from two or three different directions, take a few compass bearings on points, etc. and any other bearings possible. The next time you are out maybe you can get within a quarter of a mile of the spot you are looking for.

If you use iron cable for dredge line and use a small boat, you cannot trust a compass for bearings. They are bad enough for close work on any small boat without having a lot of changing iron in the boat. Probably the best way to determine your location is to use a sextant and a three-arm protractor. To "fix" your position with a sextant take two angles beween any three objects or points on your chart, set the arms of the protractor at these angles and place it on the chart with one arm passing through each object. The center of the protractor indicates your position. A cheap sextant will work satisfactorily for this purpose. The one that I use cost $4.50 while the three arm protractor costs $6.50.

FOUR TO FOUR HUNDRED FEET BENEATH THE SEA
DREDGING IN FLORIDA WATERS

By Jeanne S. Schwengel

Collecting mollusks is one of the most fascinating time-takers in the world, and for the amateur opens up a new world of creatures strange and rare. For those of you who have never dredged, let me say, that once tried, the urge to continue will be irresistible. There is that few moments of suspense, as the men begin to haul in the dredge, when you wonder, with a consuming curiosity, just what they will dump before your eyes, may be only broken shells and rubbish (garbage, we call it), but mostly you will find treasure upon treasure. The very shell you had so hoped to find, but never really expected; another of this and of that, so that you may share with other collectors—one load after another, never the same, always interesting.

To go about this work the weather must be propitious. Dredging simply cannot be accomplished in a satisfactory manner if the sea is too rough, or the day too cold or wet. My first dredging was under the experienced tutelage of Mrs. Nelson R. Perry and Theodore T. Dranga, and I doubt if two more capable or experienced teachers could be found. Our boat was one of the fishing cruisers of Sanibel, large enough to be comfortable for us all, and powerful enough to haul our heavy dredges at any depth we wished to fathom. The dredges we had made at a blacksmith shop: a strong iron frame about 36″ x 20″ x 8″, covered with heavy ½″ wire mesh, a heavy flanged cutting edge on both 20″ lips, iron rod arms from each corner of the opening, each two side arms converging into a loop for a 6′ chain which joins in another ring, large enough for the ½″, or more satisfactory ⅞″ manila dredge-line to be run through and safely knotted. At times we use a regulation Maine scallop dredge, and again a tangle, which is made of a cross-bar to which our dredging rope may be attached, and a mass of unraveled manila rope of varying lengths, the whole about 30″ wide and about 8′ in length. This is an excellent way of collecting pectens of all species, and in many cases spondylus will be dragged up with the tangle, also pinna and other shells with a rough surface that will cling to the threads of the tangle.

For dumping of the material, we have had built what we call a dredging-board. It is about 3′ wide, and is arched slightly in the centre so that the water will run off easily. It reaches about a foot beyond each side of the boat, and has a rail about 3″ high on each side, with the ends left open. This is placed across the back of the boat, leaving space for the men to stand between it and the end of the boat, unless there is a small deck, as in some fishing boats, in which case the board is placed as close to the deck as possible, and the men stand on the deck to do their hauling.

When dredging in waters which are not familiar, it is best to have one of the Government Geodetic Maps, which gives depths and the type of bottom. By consulting the map you can determine what type of shells you are apt to bring up, how much rope to use, and which type of dredge will be most satisfactory. Another necessity is a sounding lead to check your depths.

One of the men always sits with his hand on the dredge line, and after practice, can tell just what type of bottom the dredge is working on; if it is biting, or floating. In great depths, weights must be attached to the dredge line near the mouth of the dredge to keep it on the bottom.

Along the near side of the dredge board, we have tacked heavy tape, making pockets for different sized bottles, which are fitted into place as soon as the dredge goes over-board. These are partially filled with water, so that the shells will have a cushion when they are dropped into the containers. It is well to have several different sizes, and the shells can be more or less sorted as they are collected. Under the board are placed large buckets into which are put the larger shells, pieces of coral, and in some cases, old shells or algae. These things are looked over carefully after the smaller shells are cleaned, and many minute shells are taken in this way. All records of depth, location and type of bottom should be kept with each dredge load.

When the dredger feels that the dredge is full, and this knowledge comes with practice, the word is given, and the boat slowly backed as the rope is hauled in, so as to take up slack, and when the rope is vertical, the dredge is hauled up and the contents dumped on the dredge board. The sponges, beautiful colors and rare shapes, but vile smelling, are quickly looked over, and in most cases dumped overboard before we really begin the work of sorting the catch. Rubber gloves should always be worn, as the sponges and algae are sometimes poisonous, and will cause an annoying rash. Quite often small morays, crabs and the vicious dog fish are brought up, and the hands must be protected. It is very helpful to use strong forceps, about 12″ long. They can be used to pick up near treasures, reach over for those at a distance, stir up the mess when the top layer is sorted, and are fine to push the discard off the ends of the dredgeboard when one is reasonably sure there is nothing of value left. In fact, forceps or tweezers are almost a necessity, as the hands are very clumsy in rubber gloves.

A jar of preserving alcohol is often useful, either for a fine shell where the animal must be retained, or for those too small to be cleaned, as melanella, bittium, cerithiopsis, caecum, etc. Also whenever dredging, I throw in all small fish and crustacea, and have collected quite a number of new and very rare specimens of each, which are gladly received by the Museum.

Last, but certainly not the least important, is a jug of fresh water and a substantial lunch. If there are cooking facilities on the boat, have something hot, as food is a great cure for sea-sickness, and nothing upsets the equilibrium as much as dredging. The motion of the boat, the exhaust odors when the boat is backed to facilitate hauling of the dredge, the movement of the mass on the dredge-board when working it over, and the noxious odors of the assortment of sea life so close to your nose, is all very annoying.

But—no matter what the inconveniences of mal de mer or aching back, the catch is always well worth the struggle. So join the crowd for more and better dredging.

DIVING AS APPLIED TO SHELL COLLECTING

By Thomas L. McGinty

Doubtless, the art of diving was known to man long before he became civilized. The first divers probably knew nothing of pearls and treasure but contented themselves with tapping nature's lavish supply of food in the shoal waters close to shore. Although primitive, according to modern standards, this simple method known as skin-diving is still employed by native pearl divers. It is equally as well adapted to the collecting of shells.

For the sake of better vision, the diver-collector had best be equipped with some manner of underwater goggles. The most useful type, more of a mask than a goggle, is made of a single sheet of glass fitted into a rubber cup which fastens over the diver's face, leaving his mouth exposed for gasping air at the surface.

The collector need not be a masterful swimmer, capable of holding his breath for long periods under water, for many interesting shells are to be found at wading depth and by the simple expedient of placing his face in the water he may examine the rocky crevices and closely observe the gorgonians for possible molluscan life. Heavy rocks, too large to be turned without the water's helpful buoyancy, may be flipped over and the under surfaces carefully searched for living specimens. It is a fascinating and profitable experience which affords the collector a view of undersea life quite unattainable through a glass-bottomed bucket, from the surface. The limiting factors are, of course, the inability to stay down as long as desired and the relatively shallow depth to which it is practical to descend. At thirty feet the pressure upon normal ears becomes extremely painful and it is dangerous to attempt diving much deeper.

The wearing of heavy canvas gloves is advisable if rock turning is planned. Caution must be exercised before a hand is inserted into a crevice or rocky cavity, for, in tropical waters, morays and stone-crabs are capable of inflicting serious injury. The modern bathing suit exposes such a quantity of human epidermis that care should be taken to prevent stinging hydroids and corals from touching uncovered surfaces. The stinging, although not particularly dangerous, is most annoying. Clear water is as essential to the diver's safety as it is to his efficiency. Large fish are much less likely to mistake a diver for something edible if the visibility is good. In the event that a barracuda should approach the swimmer must endeavor to be calm and deliberate in his movements. He should never attempt to work around rocks in a pounding surf, for the glass face-plate might be smashed with disastrous results to his eyes. Some sort of a "game bag" is almost necessary. It may be tied about the waist but must be so fashioned that it cannot dump its contents. If vials are used, they should first be filled with water, for air-filled vials have a disconcerting tendency to float away and become lost.

It is extremely difficult to offer any helpful suggestions regarding manner of collecting and where to look for specimens. Habits of marine mollusks vary widely with locality and often the best collecting occurs in the least likely looking habitat, hence, no regular rules may be followed. Much remains to be learned about the habits, breeding cycles and seasonal migrations of even the commoner mollusks. No one knows why an area which affords marvelous collecting one year may be devoid of life the next. Remember, however, that most mollusks are exceedingly gregarious and while the search for that nearby colony may long seem futile, persistence, in the end, does not go unrewarded.

For general usefulness and practicability to the collector nothing seems to surpass the skin-diving system. There is, however, another device, the diving-helmet, which offers certain advantages. Because of the helmet's constant supply of fresh air, pumped down from the surface, a diver is permitted to roam about leisurely and in comparative comfort at greater depths than is possible with "goggles." For purposes of observation the helmet is almost ideal. The collector has ample opportunity to watch for the tell-tale movement as the large *Pecten* and *Spondylus,* ordinarily so algae-covered as to be unrecognizable, snap their valves closed. He may also gather large sacks of sponge and other material to be sent to the surface and later examined for living minutia. In fairness, we must admit certain disadvantages for this manner of collecting. The associated gear is necessarily bulky and expensive. On the bottom the diver finds movement clumsy and awkward, for the helmet must always be maintained in a nearly upright position to prevent the precious supply of air from escaping. Also, helmet diving is not entirely without an element of danger. Contrary to popular belief, few divers are lost because of attacks by undersea creatures; most are lost because of defects in diving mechanism which throw a sudden strain on the human system, a system never designed for such abuse.

We shall not attempt in this short paper to discuss the effects of pressure upon the human organism but suffice it to say that present day man is poorly adapted to withstanding any considerable or sudden changes of air pressure. This same air pressure, so necessary to counteract the crushing weight of the water, is always the diver's greatest fear, for with it comes the dreaded bends." Fortunately, the shell collector is unlikely to be diving at a depth greater than thirty-five feet and may disregard the worries about decompression to prevent the occurrence of this crippling malady. Make no mistake, however, for the pressures encountered in helmet-diving at depths no more than twenty or thirty feet are potentially dangerous. It is important that a novice fully realize this fact and exercise every precaution to avoid trouble. Rule number one should be: *Never leave the helmet while it is underwater.* The United States Naval school of diving considers a rise of only seven feet to the surface, when the lungs are filled with air under pressure, as being dangerous to human life. When you go down or come up from a dive, do so slowly and continue regular breathing at all times. Never hold the breath while ascending, even though the air in your helmet may seem foul. Rule number two should be: *Move slowly while underwater.* Any unusual exertion brings undue fatigue and the diver must always have sufficient energy in reserve to cope with problems that cannot be anticipated. Observe these simple rules and you will be safer in a diving-helmet than you would be while crossing a busy city street.

Perhaps some of the Malacological members have yet to make their first dive, and are curious to know something about what one sees and does below, before making the venture. Let us go on an imaginary diving trip together.

For our first dive let's explore the wreck of an old schooner which lies in thirty feet of water along the edge of a Florida coral reef. You are probably amazed at the various assortment of gear which is needed for the diving operation. The bulky helmet weighs nearly seventy pounds and has a safety-valve where the air-hose connects, so that even should the diver cut his hose, some air will remain trapped within the helmet. Enough, we hope, to keep him alive while he climbs back to the surface. Amidships is the air-pump, a manually operated two cylinder affair, which requires considerable dexterity upon the part of the pumper as he works the long handle from side to side, the constant heaving of the sea tending to throw him forever off balance. The long coils of air-hose are cumbersome and ever in the way until finally fed out to the diver.

With a glass-bottomed bucket we locate the wreck and drop anchor. Down goes the descending-line, a rope with heavy weight attached, dangling just clear of the bottom. You're first down, so jump off the stern and hold the descending-line firmly while some one drops the helmet over your head. Raise your right arm and the tender will make a loop of hose around your shoulder so that if he desires to bring you up suddenly he won't haul in a helmet, but no diver. The helmet weighs a seeming ton at the surface so try to keep it balanced, for if you lean too far back it's weight appears about to break your neck. Some one thrusts a hammer and crow-bar into your hand and you hastily secure both, in some fashion, under your belt. The pump tender is giving you air and signals you off so you begin the descent. Down you go, very slowly, hand over hand, on the rope. How dead your ears suddenly feel! The only sound in the universe is that dull thumping of the valve in your helmet. Rhythmically it goes on, almost as if you were listening to your own heart beating. The helmet no longer feels heavy, now you are light and free and the slightest effort is sufficient to make you go up or down on the descending-line. At a depth of twenty feet you feel an increasing dull pain in your ears. Don't worry, but climb back a yard or so on the line and swallow a few times. You must force some of the air under pressure into the tubes leading to the inner ear so that the ear drum has an equal pressure on both sides. Ah, that feels better, pain's gone, so keep swallowing and drop down the rest of the way more slowly.

At last, like a figure in slow-motion, you feel your knees give slightly and alone you stand on the ocean's floor. For a moment you'll fondle the descending-line and hesitate to give up that last tangible connection with the world above, for as you gaze about, you realize that this is a different world, far stranger than anything you had ever dreamed. Myriads of living creatures, seemingly forever in effortless motion, lend an air of unreality to this strange fairy-land. In the dim distance the great pink sea-fans sway slowly to and fro, for all the world like trees in a breeze, but a gentler softer breeze than the earth above has ever known. The uncanny coloring is strange and vivid. Objects close by are weirdly tinted with a suffusion of pale green, those just beyond have a faint bluish aura enveloping them, while at a still greater distance the water seems to shroud everything with a heavy veil of deep indigo. The surface, far above, is an ever undulating mirror which reflects sparkling but inconsistent patches of light upon the clear sandy bottom.

After a few moments of choking sensation of almost unbearable solitude the sense of intrusion upon a world forbidden begins to pass and in its place comes a feeling of complacency. It is almost as if you weren't quite sure but that you really belonged here. Your courage mounts and an urge to explore sweeps over you, so, leaving the descending-line behind, you make your way towards the wreckage on the sandy bottom. Progress is not nearly so rapid as you had supposed it would be. The body seems light and feet have trouble getting proper traction, but by leaning far forward and bending the knees slightly, you move about with reasonable ease. A foggy mist has formed upon the face-plate within your helmet, and since it obstructs your vision you clear things up by sending a mouthful of sea-water forcibly against the glass. Perhaps you hadn't realized before, how high the water in the helmet rises.

Before you lies a great vertical wall of wreckage so covered by algae, sponge and coral that it bears not the slightest resemblance to any conceivable part of a ship. Peering intently through your little window your eyes pass over patches of deep purple, bright red, vivid yellow, orange, lavender and green—colors so fantastic and irregular that they quite defy description.

Wait a moment, there was a sudden movement in that patch of heavy algae just in front of you, and a speckled brown something, visible a moment before, has quite disappeared. You become interested and examine the area more closely. Ah, yes, here it is—a large *Spondylus,* so covered with a coating of algae as to make it undetectable. But for that slight movement, as it snapped its valves together, and the sudden disappearance of its brownish mantle, you would surely have passed it by. You remove it with hammer and crow-bar quite easily but are careful not to injure its long flat spines, for this is a really superb specimen. The *Spondylus* is so large that it alone would half fill your game-bag so you decide to deposit it upon a clear patch of sand, and pick it up later, when you return. Other movements in the thick algae attract your attention and you discover that they are caused by many large *Arca* and *Chama,* so perfectly concealed as to be otherwise impossible to find.

A little further along you pause in front of an unusually attractive patch of brain coral. Using the crow-bar you pry off chunks at the edges and search for coral dwelling mollusks, like *Coralliophila.* As you work, surprising numbers of small fish, the "slippery dicks," appear from nowhere to nibble at the "crumbs" you leave.

Wandering on, your eye catches flashes of movement as the queer little sea-worms withdraw into their tubes. Their umbrella-like appendages disappear so rapidly as to seem unreal, a mere figment of the imagination.

Ah, here is something. A gorgeous *Pecten nodosus,* hanging like a pendant, byssus attached to a bit of old spar. You are careful to grasp the specimen firmly before inserting it into your gamebag for big *Pecten* are strong swimmers and once one eludes your grip, it is assuredly lost as a collector's item.

There, in the distance, about shoulder high on the vertical wall is something that seems worth investigating. As you come closer you hardly believe your eyes, for it is a beautiful large specimen of *Murex spinicostatus,* all spines perfect and exquisitely formed. In your haste to capture it you scarcely notice the meaty appendage beneath it, although a thought runs through your mind that it is certainly an uncommonly large mollusk for the size of the shell. You reach out your arm greedily to pluck your prize, only to have it jerked abruptly away. Being thrown quite off balance you stumble back a step or two, not fully understanding how such a thing can happen. Just as you are about to make a second grab for the specimen you notice a writhing serpentine arm edged with sucker discs the size of a quarter dollar. With a pulsating movement, it seems to be reaching for something near the shell. In a fit of sudden horror you realize that you had attempted to deprive a huge *Octopus* of his meal! Although the body of the loathsome creature wasn't visible, probably being concealed somewhere within the wreckage, you feel sure that the snake-like arm you saw measured four feet. A bit unnerved, you watch, all fear and trembling, not knowing just what to do next. You clear your face-plate with a mouthful of water and discover that the repulsive thing has melted away. As though in a nightmare, you decide that it is time to come back to the surface. In your excitement you have become hopelessly lost, for there is no sun or sense of direction in this underwater world. You reach around for your hose and follow it anxiously towards the descending-line. Don't go too fast, no hurry, and don't step on any of those big black pin-cushions, for those urchin spines are every bit as sharp as they look and burn like fire if they pierce your skin. Watch when you climb over parts of the wreckage, too, because some of those pretty lacy things that look like plants are really animals, stinging hydroids, and can produce an almost intolerable itching if rubbed against exposed human epidermis.

There is so much more we wish you could see on your first dive. If only you could try your hand at collecting *Cyphoma* on the gracefully waving sea-plumes and then look for the dainty *Simnia* on the pink and purple fans. Or you could turn small rocks at the edge of the reef and search for choice *Conus nebulosus*. Oh, well, there are a thousand things, but they must keep for the next dive. Being such an ardent conchologist, you've scarcely noticed the fish that swim in such numbers all about you, nor have you paused to drink in the exquisite beauty of their gay flashing colors. While you were kicking to one side the ever inquisitive trigger-fish, a procedure which you found quite useless, morays, their wolflike heads barely protruding from their rocky homes, watched you with beady eyes. Crawfish lurked under the very wreckage over which you walked, and had you peered down into the dark interstices of the old ship, doubtless you could have made out the dim outlines of a huge jew-fish, hermit that he is, slowly opening and closing his cavernous jaws. Perhaps it is just as well that you were so intent on the mollusks, for had you permitted your eyes to wander you might have seen a ghost-like shark glide silently by, or a barracuda, sleek and terrifying, may have looked you over carefully before he decided upon some other form of food for dinner.

But this time you heave a sigh of relief when the descending-line looms into view. With your precious *Spondylus* safely retrieved you begin the ascent. Slowly you come up, breathing all the while. The top at last! You pass your *Spondylus* to some reaching hand, some one else lifts off the helmet, and feeling like a man who has just returned to earth from a visit on Mars you commence to babble about all the strange things you saw below.

NOTES CONTRIBUTED IN THE DISCUSSION OF SYMPOSIUM PAPERS

Dr. Bartsch has found that in late summer when streams are choked with vegetation, freshwater gastropods may be collected by the following method: A string is tied to a lump of suet which is then thrown out into the stream and left for a week. When the suet is pulled in mollusks will be found clinging to it.

Dr. Pilsbry recommended pulling out masses of vegetation with a rake. Then dry and shake over a newspaper.

Dr. van der Schalie suggested adding a little borax or chalk to formalin when alcohol is not available in the field. 4% formalin with chalk will form formic acid which is a good substitute for alcohol. Although the disadvantages of formalin are recognized, it is a practical method for preserving material in the field and formalin specimens are better than none at all. The neutralizer helps to overcome some of the hardening.

Mr. Clench recommended corrosive sublimate as another substitute. This works well on marines. After 24 hours pour off and dry. It is important to use glassware as no metal must come in contact with the solution. Two ounces will preserve three or four barrels of material. In small quantities 2 cc per quart of water is ample. This solution should not, however, be used on *Cypraca, Oliva* or other highly polished shells.

Mr. Nylander gave his simple methods of collecting when he commenced this engrossing pastime at an early age. His equipment consisted of a pail and two strainers from the kitchen: a tea strainer and a larger gravy strainer. The strainers were used with the tea strainer held below the larger one. Material was spread out on a newspaper to dry and later sorted with a pen knife.

Lymnaeas were collected from algae-covered rocks at the mouth of a stream where it emptied into a lake. Small planorbids were found under the loose bark on a submerged cedar log. Small Pisidia were dug out of the mud, strained. and dried on newspaper.

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Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. The annual dues are one dollar. There is no initiation fee. For further information address the financial secretary, Mrs. Harold R. Robertson, Buffalo Museum of Science, Buffalo, N. Y.

THE
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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Meetings of the Association for 1942 are to be held in Ann Arbor, Michigan (June 22 to 25, 1942), and New York, N. Y. (December 28, 1942, to January 2, 1943).

The American Malacological Union is affiliated with the American Association for the Advancement of Science, and members are privileged to attend these meetings.

This Report is printed in uniform size with the NAUTILUS
and may be bound with it if desired.

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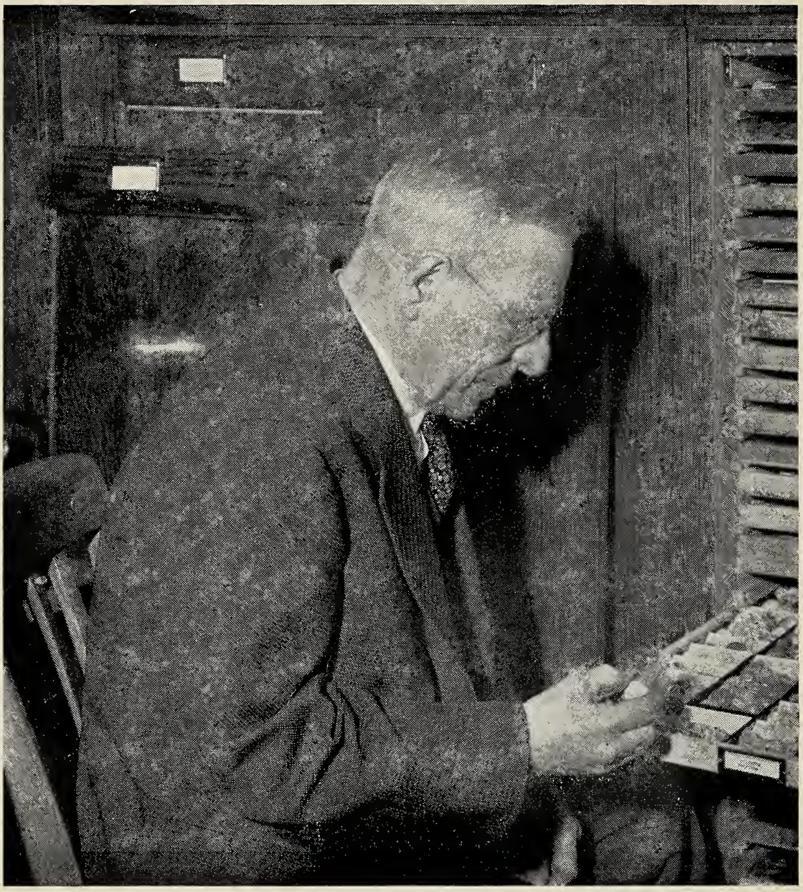


Courtesy of *The Nautilus.*

FRANK COLLINS BAKER

President of the American Malacological Union, 1941.

FRANK COLLINS BAKER

1867 — 1942

At the time of his death on May 7, 1942, Frank Collins Baker was President of The American Malacological Union having been elected to the office at the Annual Meeting in Rockland, Maine, August 26 to 29, 1941.

At that time he looked forward to the meeting scheduled to be held the next year in Washington, little knowing what changes a few short months would bring. Not only did war conditions make any meeting at all in 1942 inadvisable, but before the summer came, Mr. Baker himself had passed away.

The news of his death came to the many who knew him with a sense of personal loss, his kindness and gentleness, his cheerful patience under the handicap of deafness with which he had been afflicted for many years, together with his never-failing readiness to help the eager seeker after knowledge, having endeared him to all.

Dr. Harley J. Van Cleave has written of his scientific work and achievements in a biographical sketch published in *The Nautilus* for October, 1942, so that we need not repeat at this time, but rather give a more intimate view of this truly great man in the following tribute to his versatility from the pen of Grace H. Brewer, Mr. Baker's sister-in-law. Those who attended the meetings in Philadelphia and Rockland will recall how attentively she followed all papers and discussions that she might keep him informed of what was said, much of which he otherwise would have missed.

Mrs. Brewer writes:

"In his earlier days while living with his parents in Providence, Rhode Island, he was a very fine violinist in his father's large orchestra, and even after he left there and was connected with "Ward's Museum" in Rochester, New York, he continued with his music. It was through his music that we became acquainted. He needed an accompanist and was introduced to my sister, Lily Mae Hall, who was an accomplished pianist. After that she did all his accompanying when asked to play for different occasions. Later, they were married.

Naturally, before their marriage he was at our house a great deal, and we became very fond of him, he was always so thoughtful and kindhearted and a great favorite with the children of the neighborhood.

He was particularly interested in young boys and could always manage to hold their undivided attention when relating stories about his collecting trips telling them how to look for shells and snails and answering hundreds of questions.

While he was with the Natural History Museum in Lincoln Park, Chicago, he set aside a special day for children to come in when he would go into the Museum with them and spend hours explaining the exhibits and answering questions.

When Mr. Baker lost his hearing it was a great cross as he had to lay aside his violin because he was unable to play in tune. But he loved it and always kept it near him. He would often pick it up, feel it all over, run his fingers up and down the frets, then lay it down with tears in his eyes, saying, "No use, I must give it up."

His loyalty and devotion to his wife during her years of illness and his kind gentle words and tenderness never faltered up to the time of her passing away. She always came first, nothing else mattered.

During the past six years he was able to attend more of his scientific meetings which he thoroughly enjoyed, especially the last meeting of the Malacological Union at Rockland, Maine, of which he never tired of talking. During his last illness he spoke often about it and of what a joy it had been to him.

Although unable to hear one word the preacher said, he could hear the singing and was a regular attendant at church on Sunday morning, saying he was glad to be able to go and worship silently.

He was very philanthropic and generous in giving to all charitable organizations and in helping poor and needy families.

Mr. Baker was a man who never complained about his affliction, but would say, "I am thankful I have my eyesight so that I can continue with my work." This he did up to the last, completing a book on which he had been working for several years."

The publication of the work to which Mrs. Brewer refers, a monograph of the Planorbidae, is eagerly awaited by all students of freshwater mollusca to whom it will be of inestimable value. Mr. Baker's complete collection of recent and Pleistocene material, containing types of all his species when they were in his collection, and all his figured specimens, is now in the United States National Museum.

Imogene C. Robertson

Leighton, Morris M., 1943—Memorial to Frank Collins Baker. Proc. Geol. Soc. Amer. Ann. Rept. for 1942: 167-172 (halftone portrait).

Van Cleave, H. J., 1942—Frank Collins Baker. Sci., 95 (2475): 568.

—1942—Frank Collins Baker (December 14, 1867 to May 7, 1942). Trans. Ill. Acad. Sci., 35 (1): 19-20 (halftone portrait).

—1943—Frank Collins Baker (December 14, 1867 to May 7, 1942). Nautilus, 56 (3): 97-99 (halftone portrait).

THE AMERICAN MALACOLOGICAL UNION IN WARTIME

Although less than twenty-five per cent of the members of The American Malacological Union habitually attended the annual meetings which were held regularly from the time of its organization in 1931 until Pearl Harbor made it necessary to suspend them temporarily, these occasions high-lighted the year for the entire membership.

To those fortunate enough to partake of the joys which the meetings afforded, the acquaintance with leaders in the field of malacology, the interchange of experiences with collectors from near and far, listening to stimulating papers and sharing in the informalities of never-to-be-forgotten field trips, to such these events were eagerly awaited from one year to the next, and their suspension brought a sense of irreparable loss. To those less fortunate, but to whom the story of the meetings as told in the Annual Report extended their pleasure and in whom the recital aroused the determination to participate when fortune should permit, the loss is almost equally keen.

However, notwithstanding this curtailment of activities, the membership is by no means quiescent. While some have joined the armed forces and find themselves amid strange scenes and in new collecting grounds, the majority are carrying on much as usual.

The Executive Council, desirous of sustaining the interest of members and of promoting the science of malacology as efficiently as may be during this unhappy period, has decided to continue publication of an annual bulletin of news items with an up-to-date membership list, and, as a special contribution, to publish, in 1944, a complete bibliography of the works of the late Dr. William Healey Dall with biographical sketch and portrait. Dr. Paul Bartsch and members of his staff are engaged in the preparation of the manuscript.

A preliminary vote for officers in July, 1943, by the Council resulted as follows, and these names are now submitted for final action before May 1, 1944, on which date they will be declared elected unless a majority of dissenting votes has been received previously:

For President, Dr. Louise M. Perry; Vice-President, Dr. Henry van der Schalie; Corresponding Secretary, Norman W. Lermond; Financial Secretary, Mrs. Harold R. Robertson.

For Councillors: Dr. Joseph Bequaert, Dr. Myra Keen, Dr. John Oughton, Dr. Harry E. Wheeler.

The following Past Presidents remain on the Council without re-election: Joshua L. Baily, Jr., Horace B. Baker, Paul Bartsch, William J. Clench, Calvin Goodrich, Henry A. Pilsbry, Harald A. Rehder, Maxwell Smith, Carlos de la Torre.

FROM OUR MEMBERS

Dr. Joshua L. Baily, Jr. (San Diego, Cal.): Two years ago we put all our shells and our library into storage for protection—a few bombs might have destroyed the value of the collections—consequently we have nothing to report. I am still doing the same piece of research.

Dr. Paul Bartsch (Washington, D. C.): For my activities and those of the staff, a large amount of our time has been taken up with problems relating to intermediate host questions, that is, mollusks that serve human parasites and those of our domestic animals as intermediate hosts for part of their life history. This phase has assumed much greater proportions than ever before since our troops are scattered practically all over the world and subjected to parasitism. Not only this, but the returning soldiers will probably bring home parasites acquired in the various corners of the world, and if we have suitable intermediate hosts in our country, may make it possible for the rest of the American population to enjoy the ills which today are confined to the distant reaches of the earth.

We are working in connection with the National Institute of Health on problems to determine to what extent our native mollusks are susceptible as intermediate hosts for such parasites. It is desirable—I should like to say necessary—that they have, let us say live *Planorbis* from many regions of our country so that they may test their susceptibility to such infection. Specimens may be packed in moist cotton and sent by air mail to The Division of Zoology, National Institute of Health, U. S. Public Health Service, Bethesda 14, Maryland. They will be glad to reimburse the sender for such postage.

Dr. de la Torre and I have about completed a huge monograph on the Cuban Urocoptids. The small group of *Microceramus* and *Macroceramus* remains to be done. I have also taken up, and am deep in, the study of the West American Turrids.

Dr. Bartsch also writes that in trying to produce a more rational classification of the huge marine family Turritidae, hundreds of slides of radulas of these creatures have been made, and he finds that the information yielded is most interesting and promising of a basic logical arrangement, but, says he, unfortunately most students of mollusks have little interest in the animal that occupies the shell; in fact, they are rather disinclined to it since if not removed it may result in a smelly proposition. Fortunately in practically all of the minute Turrids no attempt was made to extract the animal and these were allowed to dry up in the shell; and by soaking such specimens yielded not only the radula but frequently other anatomic characters as well.

He therefore urges that collectors forget the smelly side and allow the animals wherever possible to dry within the shell if these are to be for more than show purposes. Of course the ideal way would be to preserve the animals in 80 percent alcohol, but very few collectors provide themselves with such material. Dried specimens will, however, obviate the lack of alcoholic material, so let them smell for awhile!

Clifford L. Blakeslee (Pittsford, N. Y.) is secretary of the Conchological Section of The Buffalo Society of Natural Sciences, and Mrs. Harold R. Robertson is its president. It is one of the oldest conchological clubs in the

Country having been organized in 1897 by Elizabeth J. Letson. Mrs. Fred St. John Hoffman and Mrs. Robertson are the only charter members still active in the Section ten members of which are also members of The American Malacological Union. Meetings are held monthly at the homes of members, and papers of value and reports of collecting are presented.

Two records of special interest have been reported at recent meetings. The first was that of the colonization of *Viviparus malleatus* in Niagara River at Cayuga Island by Eugene H. Schmeck. Some living specimens were introduced here ten years ago and their descendants now constitute a flourishing colony from which Mr. Schmeck procured several full-grown living individuals in the fall of 1941.

The second noteworthy record is the rediscovery of *Zonitoides suppressa* as first reported by John Walton in a paper presented before the Rochester Academy of Sciences October 26, 1891. Mr. Blakeslee tells of how he made the find last November. Dr. Pilsbry has identified Mr. Blakeslee's specimens as *Ventridens suppressus virginicus,* evidently identical with Mr. Walton's.

Mr. Blakeslee writes: In the latter part of October, 1943, while strolling through the Park (Mendon Ponds Park, Monroe County, New York) my attention was directed to a couple of shells in a depression beside a strip of woods. They proved to be *Triodopsis albolabris.* As time did not permit of any search for additional specimens at the moment I resolved to come back in the near future and search for these and other species.

On November 2 the opportunity came, and a visit was paid to the site. A short distance from where the *Triodopsis* were picked up a site was selected about fifty feet square at the bottom of a wooded slope with a southern exposure. The soil was sandy on top and as the sun was shining the soil was warm. The trees were barren of leaves To avoid contact with the damp soil and leaves with which the ground was well covered, a piece of oilcloth was used to lie on while searching for the shells. To avoid obscuration of small shells if present, by shadows from the slanting rays of the sun, the hours of twelve to two were selected for the work.

Operations were begun at the lower left corner of the selected site and continued by reposing on the oilcloth and raking back, systematically, small sections of the leaf plats. This was done with a small hand rake and the value of the noon timing was immediately appreciated in noting the small furrows left by the rake but open to the full sunlight. In the two hours were found, dead and alive in about equal proportions, the following: *Triodopsis albolabris* (8); *T. dentata* (3), *T. tricarinata* (5), *Stenotrema hirsutum* (2), *S. fraternum* (2), *S. monodon* (3), *Mesodon thyroidus* (1); *Mesomphix cuprea* (4, *Angiuspira alternata* (5); *Ventridens suppressus virginicus.*

The *Ventridens* were strangers to this collector and therefore not recognized. Eventually they were sent to Dr. Pilsbry who returned the identification as above. A reference to old records revealed that this was not the first record for New York as Dr. Pilsbry at first believed, but that it had been discovered, apparently in the same vicinity, by John Walton and reported by him in 1891, as above noted.

William J. Clench (Cambridge, Mass.): My staff has been sadly depleted during the past two years. Eight members of my department are now in the armed forces or in the War Effort. However, we are getting along and doing everything in our power to keep as active as possible. Much of our time is directed towards the War Effort in the form of specific lectures, looking up data, and making available information on material and about regions with which we have been associated. Our research time will be devoted to *Johnsonia*, and every effort will be made to get out the number of pages planned for each year.

Pvt. Richard I. Johnson is stationed at Elm Hall, Iowa State College, Ames, Iowa; Ens. R. Tucker Abbott is with the Navy Air Force in Cuba; Dr. Merrill E. Champion is now with the Massachusetts State Department of Health; Richard W. Foster is now in Florida doing war research; Pvt. J. Alden Cheever is at Fort Benning, Georgia; Dr. Joseph C. Bequaert is now working on Tsetse fly investigation in Africa.

A letter from Allan Archer (Jan., 1944) gives his present address as Lt. A. F. Archer, Camp Van Dorn, Mississippi.

Joseph S. Gaylord (East Longmeadow, Mass.): In June Mrs. Edith R. Campbell and I were married. We are spending the summer here in my house . . . Of course I spent a good deal of time with my shells. Recently I have been comparing my shells with those in the Springfield Museum of Natural History. The collection there is small but well chosen. Mr. and Mrs. Gaylord are spending the winter in St. Petersburg, Florida.

Calvin Goodrich (Ann Arbor, Mich.): Our work, just now (December, 1943), is largely scraps and patches, the fault for which can be put on the war. Henry (van der Schalie) has been taken from us to conduct laboratory courses in zoology, and is in the museum for only a short part of the week. Marsh has been away for more than a year on some kind of a mission he cannot hint about even to his folks. My own time was to be up in February, and has been extended to June 30—the one thing certain being that life at age seventy is blamed uncertain. Archer is second lieutenant in a camp in Mississippi.

Dr. Wendell O. Gregg (Los Angeles, Cal.): My war-time activities do not leave much time for molluscs, but what time I can spare has been spent struggling with the slugs. (That this time has been spent with profit to students of the slugs in Southern California the splendid article in the Minutes of the Conchological Club of Southern California for July, 1943, "Notes on Land Slugs of Southern California," by Dr. Gregg, is convincing proof.)

Dr. Fritz Haas (Chicago, Ill.): Due to lack of field work in these war times I did not collect shells or study life conditions of a given locality at all, nor was there much incoming material which could start research of any interest. So I have devoted my time to the revision of part of the Field Museum's (pardon me, Chicago Natural History Museum's) old collection which had been acquired in 1895 but had never been studied since then. This is the Philip P. Carpenter Collection which constitutes the third choice part of Carpenter's entire collection, the first two parts, containing his type specimens, having previously gone to the British Museum and the United States National Museum respectively. In spite of its being third choice, this collection contains not only many paratypes of Carpenter's, but also valuable authentic material received from noted collectors such as the Rev. H. B. Tristram, Robert M'Andrew, O. A. L. Moerch, J. G. Jeffreys, and others.

Besides the shells from these sources which offer a great scientific interest, I found one which provided an equally great human interest. This is a specimen of the largest European Venerid, *Paradione chione* Linne which is accompanied by the following lines in P. P. Carpenter's handwriting: "This identical specimen was the first beginning of my collection of shells, being offered by my sister Mary and earned by me, as a prize for order! I think in June, 1832 (or 31)."

DR. MYRA KEEN (Stanford University, Cal.): Dr. Schenck is gone for the duration. He is a major in the Army. Dr. Muller is in Washington on a special assignment for the U. S. Geological Survey. In consequence I am holding down the paleontological end of the Department alone and find myself teaching a course in a subject—micropaleontology—which I have never studied. It is quite an experience!

NORMAN W. LERMOND (Thomaston, Me.) is about to publish his autobiography. In his announcement he says: "I should not think of publishing this history of my life were it not for the historical mention of several Americans, and one or two foreigners, whom I met and became more or less acquainted with; for example, William Lloyd Garrison, Ralph Waldo Emerson, Edward Everett Hale, Dr. Carlos de la Torre, Rev. Lyman Abbott, Jacob Abbott, Harriet Beecher Stowe . . . and others."

The appearance of this book is eagerly awaited by us all. The price (paid in advance) will be $2.00 plus 10 cents for mailing.

MAJOR MERRILL MOORE, M. D. (Boston, Mass.), is applying his unique treatment of nervous strain by the use of sea shells, in United States war hospitals in New Zealand. We quote him from an article in a New Zealand newspaper on his work: "The use of New Zealand sea shells was begun in Auckland . . . The hospital is fortunately so placed that the Auckland War Memorial Museum can be easily reached. Mr. A. W. B. Powell, the acting director of the museum, who is a well-known conchologist, not only contributed generously to the work by giving large quantities of the most beautiful examples of New Zealand shells, but came in person to the wards and helped to distribute them to the patients

. . . You would be surprised how much they appreciate them. Surgical cases after operation enjoy having shells to look at and listen to, and men who have arm injuries like to have a shell to grip and squeeze. They use it to re-educate and exercise their fingers. . . . Some of the men develop a scientific interest in them and others become interested from an artistic point of view."

DR. JOHN OUGHTON (Toronto, Ont.): I am spending the month of August (1943) at a small village located some 12 miles northwest of Quebec. My task here is to obtain any information that I can bearing on the life history of *Amnicola limosa* as part of a problem in parasitology. Just where it will lead I cannot tell, but I am plugging away hopefully. Last year I was successful in completing my Ph. D. dissertation on: "A Zoogeographical Study of the Land Snails of Ontario." I expect to prepare it in final form for publication this fall or winter.

DR. LOUISE M. PERRY (Asheville, N. C.): A year and a half ago I offered to organize and conduct a clinic for the Asheville Health Department, especially to care for the needs of the children in the public schools—colored and white. We laid the foundation of this work by making a grade by grade test of vision of each child in the primary and grammar schools. With these records as basis, working through the Public Health nurses in the respective schools, the parents of each child showing any ocular defect—visual or otherwise—have been instructed to take the child for examination either to the City Eye Clinic or to a private ophthalmologist of their own choice. These instructions are followed up by the nurses, and the great majority of children checked for attention are looked after.

The work has been expanded to include the County schools and a considerable number of adult patients as well, besides clinics in the outer counties arranged by the State Commission for the Blind and generally financed by local Lions' Clubs which also pay for all glasses ordered for children in their communities.

Hurrah for the Lions! The good they do in this respect is incalculable.

A very interesting and gratifying part of the work is that done for the Federal Rehabilitation Service. While one knows theoretically what a handicap is imposed by poor eyesight, it takes actual experience to realize the unsurmountable obstacle to economic independence that exists when one cannot see to work. The limited experience of our clinic has driven this home. In one case a young man who begged on the streets is now supporting a family by a position paying fifteen hundred dollars a year.

Occasionally we have a day at the Cherokee Indian Reservation in the Smoky Mountain National Park. I enjoy working with the little Indians and find them bright and alert and very much interested in learning something new. Many of them tell me they wish to be doctors or nurses, that is, when they are not planning to go to war in the Air Service. Among the Indian children in the schools is a group of young Seminoles from the Everglades of Florida. They like to talk of their homes and seem deeply attached to their mode of life and would not exchange their own low country for the mountains.

All this is far away from the delights an avocation such as malacology affords, and it is good to know that the orderly processes of life are not hindered by what man sees fit to do.

Meanwhile, may I send through you, my dear Mrs. Robertson, my best wishes and cordial regards to the members of the Malacological Union.

DR. HENRY A. PILSBRY (Philadelphia, Pa.): Conchological work in the Academy, though hampered by the absence of members of the staff in service, has still progressed. Ensign Richard A. McLean is now stationed in San Francisco, at least for the present (December, 1944). Mrs. Jeanne S. Schwengel has continued her work on Florida marine shells, having quite a number of new ones about ready for publication. Dr. H. B. Baker is working on Mexican land snails which he collected several years ago. Dr. Horace G. Richards has continued his work on the Atlantic coastal Pleistocene and its fossil mollusks.

I am continuing my work on North American land snails which will be completed early in the year.

Dr. Henry van der Schalie (Ann Arbor, Mich.): Along with the usual routine here, I have taken on a defense job in a local factory where we grind lenses for various war implements. I manage to put in five hours each night and find that it makes a long day. But the bit of weariness that comes from long hours of routine is compensated for adequately in the feeling that something can be done that constructively helps the war effort.

We do miss the opportunity to go to the A. M. U. meetings but perhaps when this war is over we'll all appreciate the opportunities we enjoy when we are able to get together for such meeting.

Phil Marsh is a doctor with the Medical Corps.

Mr. Goodrich and I have managed to hold the fort here during the past year. We have managed to submit a report on "A Revision of the Mollusks of Indiana" to the American Midland Naturalist. Although there is no possibility for a field trip this year, each of us have enough accumulated work to keep us busy for a couple of years.

Congratulations to Dr. van der Schalie on his having been awarded the Walker Prize of the Boston Society of Natural History for his work on "The Value of Mussel Distribution in the Tracing of Stream Confluence."

Dr. Harry E. Wheeler (Little Rock, Ark.): In April last I accepted an offer to become a member of the State of Arkansas Geological Survey as mineralogist and in charge of exhibits. I accepted with real delight. I lived for more than fourteen years in Arkansas and was fairly well acquainted with its natural history and geological resources. It was while a resident of the State between 1910 and 1924 that I wrote some articles on the molluscs of Arkansas and published my book on the Birds of Arkansas. I hope to get some moments slipped in on my field trips in which I can again wade the streams of Arkansas not for pearls of great price but for some of the beautiful mussels of Black, Currant, Strawberry, White and Ouachita Rivers. Maybe I will dig up a new species or two when the time comes. I have always felt that there is still much work to be done on the land molluscs.

Pilsbry and Ferris, Sampson and Brown pecked at it, and so did I after a fashion, and yet there are many localities, unvisited mountains and whole counties, from which nothing has been reported. I will not lose my first love, and can only promise I will make use of every opportunity I can to inspire my friends to visit me and open the malacological doors of our State to all who come.

I have a feeling that such rare things as *Polygyra pilsbryi* from Mena and *Arkansia wheeleri* from the Ouachita, are only bona fide invitations to ambitious collectors.

NOTES

There are among the members of the American Malacological Union several shell collectors who are also dealers; and since it is to the dealers that we usually turn when we wish any particular species, it is important that students and dealers maintain a friendly intercourse.

This can be accomplished by occasional visits to the shops if only to look over the stock. Dealers frequently obtain specimens which are unusual in size or coloration, specimens which might well grace a museum but which the expert never sees. These are picked up by the casual tourist caring only for some lovely souvenir to take to a cherished friend. Thus many a rare gem has been lost to science.

There are dealers who are scientists, and there are dealers who have not the facilities for scientific study who would eagerly welcome expert advice. So professionals and dealers ought to cultivate one another to their mutual advantage.

The Minutes of the Conchological Club of Southern California together with those of the Long Beach Shell Club (mimeographed) have been coming to us monthly for a year and more, and each issue has been enjoyed and appreciated as a valuable contribution to malacological literature.

Here are original papers presented at the meetings of the two clubs which appear to be delightful occasions, and the record thus made public should stimulate the formation of similar conchological clubs in other parts of the country.

Items of news from correspondents and visitors serve to create a feeling of friendship which extends to the entire fraternity of conchologists wherever the Minutes go. There is no subscription price, the editor asking only for contributions to cover postage.

If you are not already receiving these Minutes send your name to John Q. Burch, 1611 South Elena Avenue, Redondo Beach, California, with a little more than enough for postage. Such good work as these Californians are doing deserves encouragement.

It is gratifying to be able to announce that since the publication of the 1942 Report and membership list, twenty-three new members have been added to the Union. This appears strong evidence that the interest in shells is not diminishing notwithstanding the war-time upsetting of normal activities, and is most encouraging.

We have heard of several instances of boys in the service becoming interested in the shells found on the beaches of foreign lands where they are stationed. They have made collections to send home and are using shells to fabricate trinkets and jewelry. Some are becoming interested in a serious way. To several we have supplied copies of the 1942 Report containing the Symposium papers on Methods of Collecting and Preserving Shells.

There is still a good supply of these reports on hand, and we shall be pleased to send them to service men who may desire a copy.

BERLIN HART WRIGHT

1851 — 1940

The younger generation of biologists, college-trained and up-to-date on the latest wrinkles of cytology, embryology, genetics, and ecology, who are replacing the old timers in our seats of learning, are more than often stumped and impatient when one of those old lovers of nature who laid the foundations for all our biological sciences, drifts into their sanctum and wants to know what the object he is holding in his hand may be.

Alas, how could they know! Their training has become more and more limited in its horizon by the decreased aperture of their miscroscope objectives.

Being one of the "Old Timers," I am mindful how in the days gone by our teachers struggled to make us acquainted with things that could be seen with the naked eyes, from the stars in heaven through the clouds to the mountain tops, the trees, lakes, and rivers, not to forget the ocean. But most of all we thank goodness they helped us to know our neighbors, the denizens of the fields, forests, and streams.

It was this type of education that made many "naturalists," the old-fashioned naturalist now rapidly disappearing from our midst.

Such an old-fashioned naturalist was Berlin Hart Wright, whose periodic visits to our Museum brought not only pleasant accounts of his New York and Florida homes but pockets full of shells that required critical comparison to determine their status among their relatives—I always enjoyed those visits!

However, this is to be a biographical sketch of Berlin Hart Wright, which I believe is best told by himself. I quote from:

"Memories of Local Naturalists compiled by Berlin Hart Wright, Yates County Genealogical Society also Conservation Club of Keuka, Park, N. Y." 1936.

Born July 5, 1851, in Dundee, N. Y. My parents, Samuel Hart Wright and Joanna McLeon Wright, were of Scotch-Irish descent and Methodists. My father, while a lad on his father's farm, gathered and sold nuts with which to purchase his first books and mother taught music to keep the family while father studied medicine in New York. Later his country practice was so limited his spare time was given to mathematics and astronomy. I was badly injured in my 12th year and in bed for a year, which time was wholly devoted to mathematics and as father had a large collection of such books and was able to give aid when needed, much progress was made and was a deciding factor in my life. Because of a desire to be independent I left home and entered the employ of a farmer near Penn Yan, N. Y., to do chores in the winter for my keep while attending a school two miles distant, where I worked the following summer for $5 per month and the same arrangement for school and board in winter. This was repeated again, but at $10 per month and a third time at $13 per month, learning carpentry. What with night and Sunday study, the little red school house was outgrown and I enrolled in the Penn Yan

Academy but soon so chafed under the slow pace in the branches of chief interest that, with my books under my arm, I left the school with a mental resolve to again enter it as a teacher, a goal which was reached by persistent hard work after three years' experience in other minor schools.

At 25, while a teacher in the Academy, I married Loretta F. Mills, daughter of a local artist, who became my assistant in the school room and an inspiration and invaluable aid in my study. It was while we were teaching in the village of Dresden, N. Y., that a new railroad was being constructed through there and much sedimentary rock was being blasted out. We gathered quantities of fine fossils and by the aid of the New York reports classified them. Saturday school excursions were made to this mine of fossil material and their significance explained. This led some local religionists to exclaim that the children were being taught that the earth was older than the Bible authorities claimed, and a lot more, including, of course, cosmic evolution. Our pastor came to us for our side, with the result that he gave me his pulpit as a place of defense and on a Sunday night the church was packed and no riot resulted, but on the contrary a complete exoneration of the charges.

Compiled Geological Survey

This led up to a complete geological survey and mapping of the county of Yates, which was published by the state—the first one.

This report carried reprints of descriptions of new species I had discovered in our rock formations—two ferns, etc., and a shark, hitherto unknown in the Devonian rocks of North America, but known in England. Encouragement and aid from such sources as James Hall, Dr. Dawson, Prof. Whitfield and others was always pleasantly accorded and my father was my pal.

Father, who had been obliged to abandon his medical practice because of deafness, had turned to making astronomical calculations for almanac publishers in 1845, and for several years I had been under his tutelage in this work. Finally he urged me to take it over and give up the school room. This was done and I built a home near him. So much for the geology and astronomy.

The start in conchology resulted from a query by my wife. "Why don't you take up the study of recent shells in place of those stone forms, without color or beauty?" My reply was that I would leave that field to her. Later she brought to me a lot of local shells, mounted and named. My interest was at once aroused. The New York Natural History was consulted and the names verified and again we, with father, used all spare time collecting and classifying our local species. All this time quantities of duplicates were accumulating and we knew collectors in other parts might be glad to exchange. But how to get in touch with them was the question. This was soon solved by the appearance of the Conchologists' Exchange also Naturalists' Directory published by W. D. Averell of Philadelphia and our joy was unconfined and the collection, or museum, as it was now called, grew like Jack's bean stalk—cases, trays, labels, etc., were essential as well as new books.

Moved to Florida

Then like a bolt out of a clear sky, came a savage attack or series of attacks of rheumatism, probably due to undue exposure in wading cold waters in quest of specimens, as I had fixed upon the Unionidae as a special field. After a year or more of suffering inactivity it was made known to me by Mr. DeLand that change of climate would cure, where doctors were powerless and Florida was decided upon. Home, collections, books and all were abandoned and in Florida I found complete relief and there my home has since been, in DeLand, Lake Helen, Coronado Beach and in Lakeland now. Later on my father joined me there and we entered upon the new field opened up with great enthusiasm. Father had been in the botanical field for half a century and had an herbarium of 20,000 species at that time, so we were happy. He returned to New York and died there in 1905 at the age of 82, but not without the happiness of having a new genus named for him by Dr. Gray—*Hartwrightia floridana* and of having also himself described some new Florida species, both of plants and shells. As a fitting memorial I had my son procure a fossil tree from the petrified forests of Arizona, which marks his burial place. The consent of the government was obtained for the removal of the specimen, because of father's contributions to science.

Sells Collections

When it became difficult or quite impossible to find new material in the Unionidae and no companions on my trips I decided to dispose of that part of my collection rather than to undertake its removal to Florida and the late Bryant Walker of Detroit, who had long been a co-worker in that field, was the purchaser. It embraced about all the species of the United States, including cotypes of my own and my father's species, as well as those from many other countries, obtained through exchanges. The University of Michigan at Ann Arbor now has the collection.

The years were running against me, collecting trips rather severe, but little excursions alone in the Florida fields and forests were still possible and quite an herbarium of Florida plants, some 1,000 species, had been classified and mounted when everything went wrong again and in a brief time I was at death's door from neglecting proper treatment for some teeth. While in that condition in Florida, an offer of purchase of my entire collection for the Museum of Natural History of Cleveland was accepted. This sale included the library and herbarium left by my father and lifted a great load from my mind, knowing that the products of our life work would be of service. This left all the thousands of duplicates, minerals and Indian relics. The fossils were turned over to the Smithsonian Institution to aid in the making up of collections for schools.

Then I recovered and with my second-sight eyes hope for many happy times in the school of nature, while yet earning a livelihood, spending my summers at the old home near Penn Yan, N. Y., and the winters in Lakeland and Coronado Beach, Fla., with children and grandchildren in and near both places, ever on the outlook for new or interesting natural history objects. Having little means, and earning our living by astronomical work, surveying and map-making, the unstable financial conditions of the last few years did not seriously disturb us in our investigations.

Our latest addition to the knowledge of the natural history of Florida came about in the spring of 1933 during the exploration of some prehistoric mounds. While so engaged some beautiful mussel shells from a lake adjoining the winter homes of friends we were visiting were shown us. Half a century of close study of these forms at once caused a belief that they were new. This belief was verified upon our visit to the National Museum at Washington on our way to our New York home and it was decided to publish a description under the name of *Unio (Elliptio) sanctojohanis,* giving it the name of our hosts, making the 50th new natural history form discovered and named by the writer. The species were first mentioned in the Proceedings of the American Malacological Union at its Boston meeting in May, 1933, of which organization the writer is one of the charter members. This little grain of added knowledge of our fauna is a source of more pleasure than would be possible from the acquisition of many degrees from colleges which are often quite meaningless, as in the case of a friend newly graduated and degreed who thought the rose and thistle must be of the same family because both had thorns and was unable to distinguish between a planet and star.

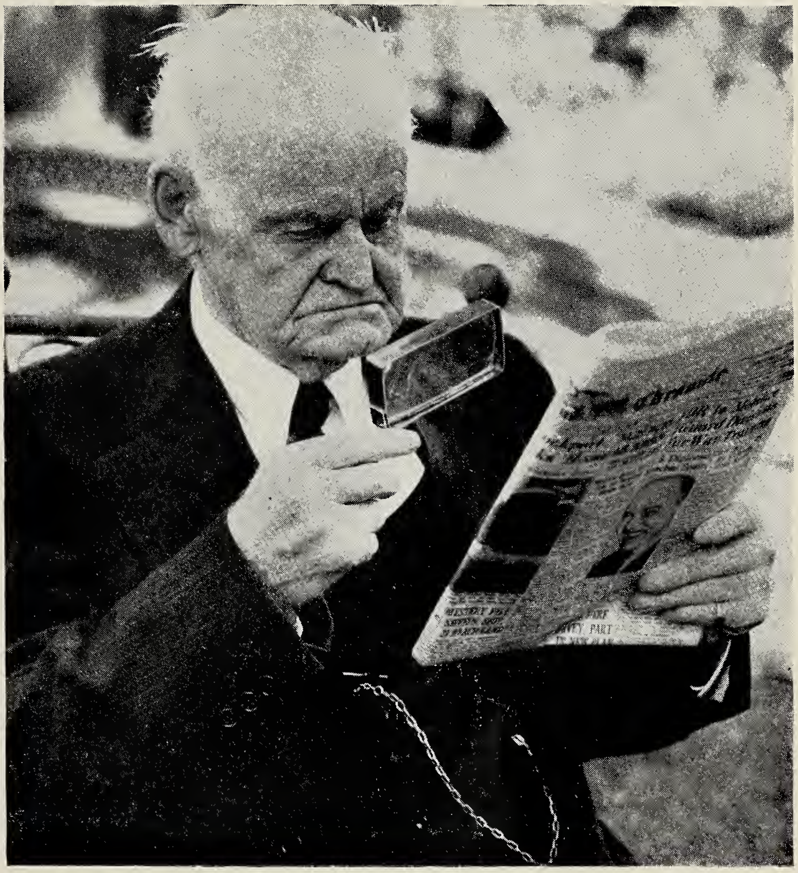
The descriptions and illustrations of our new species were published in *The Nautilus* of Philadelphia. Articles on various subjects have appeared in *The Florida Naturalist* over a period of years covering a wide range of investigation, also in the *Chronicle-Express* of Yates County. The astronomical work includes almanacs for Philippine Islands, Hawaii, Spain, South Africa, Australia, South America, Central America, West Indies, Mexico, Canada as well as some publications such as the *Chicago Daily News, Year Book Farmers', Every Day* and other almanacs and calendars.

Bellona Findings Are Interesting

Just west of the village of Bellona is exposed the black, oily Genesee slate, where it rests upon a ten-foot stratum of Tully limestone. In this soft friable shale we found a layer showing very distinct rain drop impressions, plain enough to tell from which direction the wind was blowing the storm, also fossil shells of Discinas and Ligulas. None of the latter are to be found in the Tully limestone beneath, or in the Moscow shale still further down. However, in the limestone, at its junction with the Genesee slate, are found vast numbers of corals of many kinds and peculiar shapes and, where they have been weathered out, the resulting depressions often resemble the footprints of humans and animals. These fossil corals, which lived in our seas long ages ago before conditions on earth permitted air breathing creatures to exist, are often shaped like rams' horns or reptiles.

It was at the waterfall just below Bellona that William Buxton found a gigantic Nautilus in the middle of the limestone layer. The fossil remains of this pearly shell were well preserved but too fragile to be removed from the surrounding matrix of hard rock. Also another beautiful fossil shell was found lower down in the limestone, Rhynchonella venustula, a peculiarly sculptured brachiopod, which is usually present in large numbers where the Tully joins the Moscow shale. It was in this layer that William Coon found a large Orthoceras, four inches in diameter at the big end where the chamber of habitation is located.

Just below the falls at Bellona the Moscow shale, which underlies the Tully limestone, is exposed. At this point there is a fine "pothole" about three feet deep and half as much in diameter in the bowl or enlarged lower part. This cavity is the result of the powerful current from the falls keeping small boulders and concretions in revolving motion, gradually wearing away the solid rock.



Berlin Hart Wright

The reading glass was presented by the Lakeland (Florida) Nature Study Club. The photograph was taken in 1940.

FOUND SHARK SPINE

The fine sediment, that later formed this Moscow shale, must have been deposited in a very much troubled sea whose shore lines were often changed, as evidenced by the great variation in the character of the strata. Often the formation is soft, a mud rock, abounding in small bivalve shells, hundreds to the cubic inch. Then there are found deep water deposits of very fine grained material, where the larger shells are to be found. In the less solid deposits, laid down in water to medium depth, fish remains are to be found and in this the writer found a spine of a shark, the first to be taken in America in this formation, though not uncommon in European Devonian rocks. The shark was about five feet in length and was named Ctenecanthus wrightii, in honor of the discoverer.

Lower down Kashong gully, at the lower falls, is found a wonderful formation of Encrinal limestone in some places almost exclusively composed of "stone lily."

Below the gully widens out and affords better botanizing. Our companion collector of India relics, Lorimer Ogden, added some good material to his wonderful collection, for the delta region of the Kashong was a general meeting place for the members of the Five-Nation group of American Indians who were dispersed by General Sullivan's army and their works destroyed. Mr. Ogden was successful in securing many local pieces that can hardly be duplicated and whose value will grow with the advance of the years. The magnificent collection is now in the museum of Keuka College. This was true of Mr. Buxton's collection as well."

The Wrights were blessed with seven children: Inez Ethelberta, 1874, died 1936; Lina Olive, 1881, died 1883; Burdette N., 1882; Olive Blanche, 1883; Leon Mills, 1885, now C. E. M., U. S. Navy and a steady contributor to our Museum; Leona McLean, 1883; Gladys Hart, 1893.

A lovely tribute to her parents comes from the youngest daughter, Mrs. Roland Hart, who in a letter to me writes: "I used to tell Papa that he and Mamma gave me a priceless gift, the love of the out-of-doors. Your interest with my father was in the shell field, but his knowledge and great interest in wild flowers has always been a very close tie between Papa and myself. There was never a time that he was too busy to stop his work in order to identify a plant for me. Even Papa's grandchildren will always remember his little nature talks to them, making their lives richer through his passing on of his acquired natural history knowledge."

How deeply indebted the Biological Sciences are to such indefatigable collectors and lovers of nature will probably never be known. Speaking from practically half a century's experience in our Department in the National Museum, I venture to say that more of our knowledge of mollusca, land, fresh-water, and littoral marine is due to contributions made by amateurs, and most of our writings have been based upon their discoveries.

Paul Bartsch,
United States National Museum.

SHELLS COLLECTED by FAIRCHILD GARDEN EXPEDITION

By William J. Clench

Generally few expeditions can do little in the way of collecting material for others in groups of plants or animals outside of their own specific mission. Certainly no expedition did more for a side-line in collecting than did the members of the Fairchild Garden Expedition to the East Indies. My deepest thanks are due to Dr. and Mrs. David Fairchild and Mrs. Anne Archbold not only for the time spent collecting shells but for the many long hours necessary to clean and label them properly.

The expedition was made to gather plants and especially seeds of tropical plants that would prove adaptable to the climate and soils of Southern Florida. That the expedition was successful is readily gleaned from the pages of Dr. Fairchild's book.[1]

The cruise was made on Mrs. Anne Archbold's yacht, the "Cheng Ho," a Chinese junk which was built for her in Hong Kong.

A total of 1,700 lots of shells were collected, a very goodly number indeed, even for an expedition specifically interested in collecting shells. The many lots collected were not at all limited to marine species, but many fine lots of land shells were collected, especially from the remote and smaller East Indian islands. Of particular importance were both the marine and land species collected on Helmahera and the smaller islands associated with it. So little is known, or at least been published, about this island which is so important regarding distribution and the relationship of genera of the New Guinea and Philippine Archepelagos. A visit to the Talaud Islands, lying midway between Helmahera and Mindanao in the Philippines, cleaned up a long standing problem, an error which has persisted for many years. The Fairchild party at Karakelong in this little island group collected many tree snails which had been wrongly assigned to islands off the southern tip of Celebes Island.[2]

Very much of the collection still is to be worked up. Most of the commoner species have been named and added to the main collection but many others are still without names. Collections such as this one are seldom written up in a single report, but furnish the records for a multitude of studies during the years to come. The importance of such collections cannot be overestimated as the many records are from localities so seldom visited and indeed, impossible to reach unless private means of travel are available.

How easily a locality name becomes alive! How vital such a place is when the shells carry the name, when you know that your friends collected the shells! Long before Dr. Fairchild's book appeared, I had to read again Wallace's "Malay Archepelago." I read with much greater interest about the places covered by the present expedition and now much more the history of the past seemed linked so closely with the romance of the "Cheng Ho."

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[1] Fairchild, David: Garden Islands of the Great East. Charles Scribner's Sons, New York, pp. 14-239, many plates, 1943.

[2] Clench, W. J. Helicostyla from the Talaud Islands, Molucca Islands, East Indies. Nautilus 57, p. 17-19, 1943.

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Membership in the American Malacological Union is open to anyone interested in the study or collection of shells. The annual dues are one dollar. There is no initiation fee. For further information address the financial secretary, Mrs. Harold R. Robertson, 136 Buffum Street, Buffalo, N. Y.

Attention is called to the following letter from the American Association for the Advancement of Science:

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Washington, D. C.
February 10, 1944.

To Secretaries of Affiliated and Associated Societies:

By vote of the Executive Committee of the A. A. A. S., the Association will hold its annual meeting for 1944 in Cleveland, Ohio, during the week of September 11-16.

The Executive Committee passed the following resolution relative to the programs of the meetings:

"It was voted to bring to the attention of the Association and to all of the affiliated societies that in all programs of the September meeting emphasis be placed on the indispensability of science for the future of civilization, both in war and in peace."

The Association extends to all its affiliated and associated societies a cordial invitation to participate in the Cleveland meeting. Since the Association, as heretofore, will make all local arrangements for the meeting and print the General Program, societies intending to meet with the Association in Cleveland are urged to inform the Office of the Permanent Secretary as promptly as possible.

F. R. MOULTON,
Permanent Secretary.

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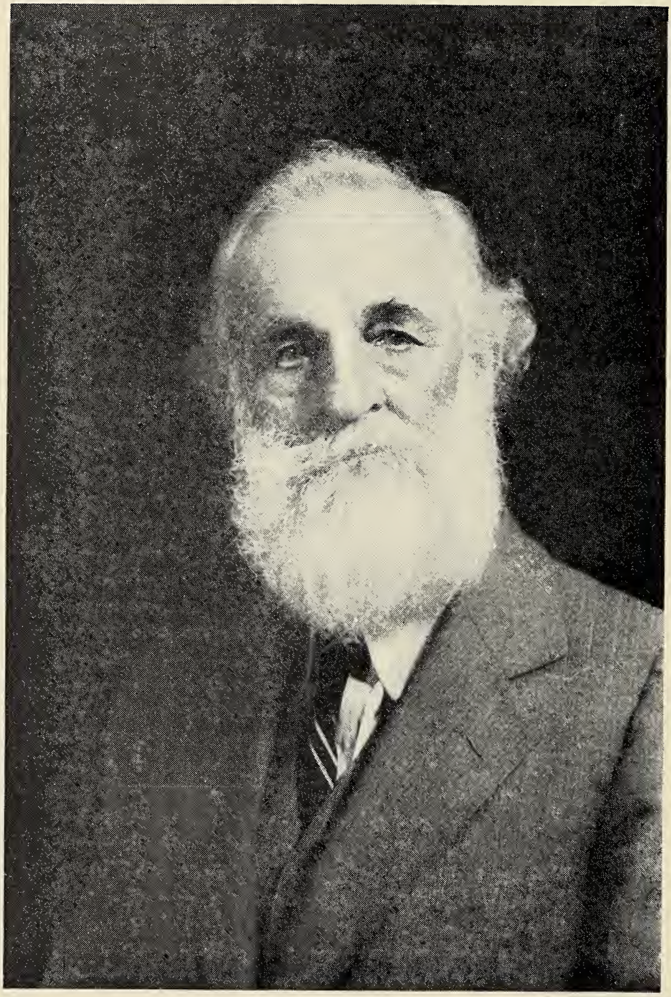

Norman Wallace Lermond

Organizing Secretary of The American Malacological Union and Corresponding Secretary from 1931 to 1944.

I KNEW LERMOND

BY WILLIAM J. CLENCH

I had the pleasure of knowing Norman W. Lermond in the later years of his life. He wanted his private collection of shells to go to the Museum of Comparative Zoölogy and wished to spend one winter working over our material. To this end, his collection was purchased, and Lermond spent several months in 1928 and 1929 cataloging and arranging much of his own collection into the main series of the M.C.Z. His own shells numbered some 11,000 lots.

An excellent way of getting to know the true worth of a man is to go on a collecting trip with him. During the winter of 1929 Lermond wrote to me that if I could take the time, Charlie Allen of St. Petersburg would furnish the car and camping duffle, and the three of us would tackle the Everglades in quest of *Liguus*. Anyone living in New England doesn't need more than that stimulus, especially in winter, to figure ways and means. An understanding Director and a real yen for the "open spaces" soon saw me in St. Pete.

After a week's preparation, camping duffle and other gear were in order and we started south via the west coast and across the Tamiami Trail. Charlie's car was old. Replacements were necessary at frequent intervals, though I can't recall that the car ever broke down in the open country. It had the nice habit of making a serious complaint only when in town and usually within sight of a garage.

One afternoon—and rather late—I suggested that we had better turn off the "Trail" on the first side road and hunt for a camp site. Eventually, one came to hand and we turned off. This was cypress lined and we continued for several miles with nothing approaching a good camp site on either side of the road. After a full turn east (we had been going south), we came to a wooded area on the north side of the road. We found a corduroy bridge over the canal and Lermond and I jumped out of the car to see if the other side of the canal offered sufficient room to pitch the tent. A pile of newly cut brush was in the way of the car on the far side of the bridge and when we attempted to get it out of the way, we noticed our first *Liguus* clinging to the branches of the cut trees. Rest assured that we camped there that night! Actually we remained ten days. This particular area was Hammock no. 4 at Pine Crest, Florida.

The following ten days were filled with the joy of collecting new material in new country. Only four collectors had been in that area prior to us: Mosier, Farnum, Deckert and Fairchild. It was through Sandy Fairchild that I had heard of Pine Crest, a region newly opened by the Tamiami Trail. Each day Lermond, Allen and I hunted for new hammocks, each with its particular color forms of *Liguus*. I had collected *Liguus* in Cuba, but never in the quantity that existed at Pine Crest. It was Lermond's first "Lig" hunting.

It was a delight to be with these two old men about the camp. After supper was over, the two-hour period between eating and sleeping was devoted to some very heated discussions. Both Lermond and Allen were radical socialists, both were politically minded, and both had run for offices on the Socialist ticket. The origin of the Gulf stream, Evolution, and many other subjects as well as politics came in for discussion.

Being younger by some 35 years, it was my job to see both of these men comfortable for the night. Lermond never failed to ask for a drink of water after he was in bed and Charlie Allen, who suffered severely from stomach ulcers, was often wakeful. After the light was out, he would think over some discussion of the early part of the evening. Suddenly he would call out "Bill, why do hurricanes follow a parabolic curve?" I hate to think now what many of my answers must have been!

Our trip continued from Pine Crest to Miami and south to Lower Matecumbe Key. Returning to Miami, we all had the great pleasure of meeting Norman Farnum and seeing his fine and, at that time, unequalled collection of *Liguus*. This collection was later purchased for the Museum of Comparative Zoölogy.

From this time on, Lermond paid us a visit at Cambridge about twice a year, usually on his way to and from Florida. His progress with the Knox Academy at Thomaston, Maine was slow. Eventually, a two-story museum building was erected on his farm which he had given to Knox County. During the last few years of his life, he became quite anti-religious and, as a consequence, antagonized many people who had helped him and aided his museum development. This anti-religious phase of his character was unknown to me in the early days of our friendship. I learned of it only recently during a visit to Thomaston. After his death, in 1944, the museum was closed. Lermond, at his wish, was buried under a huge pine tree near the museum entrance.

At Lermond's death, the Knox Academy and Arboretum ceased to exist. The County decided to liquidate the museum and its contents. Certain of the collections were purchased by individuals, but the shells and the cabinets were purchased by Colby College in Maine for their new Science building. A large portrait of Lermond will be hung in the collection room.

A detailed account of his life appeared in the Nautilus 58, pp. 102-105, Jan. 1945. An autobiography which he was writing was hardly under way at the time of his death.

Lermond was an ardent correspondent and formed close friendships with people all over the world. He told me on one occasion that he had instructed Walton of South Australia in the art of collecting shells. Walton later became noted as a collector and his shells reached cabinets the world over. Lermond, as the result of his interest in Walton, received in time one of the finest collections of South Australian shells existing in this country.

A born organizer, Lermond, all through his life, attempted to bring groups of people together, mainly on a political basis. His last effort was the organization of the American Malacological Union, which will forever remain a tribute to him as a naturalist. The Union had its inception in Young Lee's Restaurant in Harvard Square, Cambridge. It was Lermond's own idea and it was developed and enlarged upon over many a dinner of chop suey. However, it was not until the winter of 1931, while he was in Florida, that this idea took final form and it was due to his efforts alone that the first meeting took place during the spring of that year in Philadelphia.

Everyone has his little peculiarities and Norman Lermond was no exception to this rule. For example, he considered himself a vegetarian, but he apparently made a distinction between mammals and birds. He would eat no red meat, though chicken, fish and the lesser invertebrates such as lobsters, crabs, scallops and clams were thoroughly enjoyed with no thought of inconsistency. He had little sense of the value of money. His mind was fertile in projects, but many were of a somewhat impractical sort. Nevertheless, he was sincerely devoted to science and his letters to the last are filled with fresh enthusiasm and interest in malacology. His autobiography, had he lived to complete it, would have made interesting reading.

SIX LIVING SOUVENIRS OF THE 1941 A. M. U. CONVENTION IN MAINE

BY MRS. FRED ST. JOHN HOFFMAN

At the convention of the American Malacological Union held at Rockland, Maine, in August, 1941, a lobster luncheon in true picnic style was one of the features. After a trip across Penobscot Bay from Rockland to Andrews Island, we stopped first at The Neck, the name given to the point of land jutting from the island. The tide being out, we scaled the crude ladder to the land above, picking *Littorina littorea* and *Thais lapillus* as we mounted. A marvelous view of the bay and surrounding islands spread before us. Standing on the outcropping granite, the islands round about seemed alike in sustaining a few trees, mostly pines.

A lusty shout pierced the air, and in a few moments we all knew why. A colony of *Anguispira alternata* (Say) lay exposed in the pine needles and twigs beneath one of the trees showing that they may live in the soil of coniferous as well as deciduous forests, acid soil notwithstanding. But here they were, actually huddled together as if for comfort and protection during the long, cold Maine winter that lay ahead.

A few days after reaching home I decided to clean, label, and arrange such shells as were collected. After having placed the specimens of *Anguispira* in a bowl of warm, slightly soapy water, I was called to the telephone. To my amazement upon my return, the six specimens were floating about on the water. I hastily placed them in clear water and brushed the dirt off their shells.

Considering that they merited a reprieve for having survived without food or water the long auto journey to Buffalo, I selected an oblong dish that could easily rest on a window-sill, filled it to within an inch of the top with soil taken from under the blue spruces, cedars, and pine trees in our yard, with a few twigs and broken needles left in.

The next problem was food. One can depend usually on lettuce as the "staff of life" for snails, now that refrigeration makes it available the year round. However, I felt the 'Happy Six" might like a change of diet, so through the almost four-year period of their captivity have tried various vegetables. Cabbage was tested but not relished, even the heart; raw potato peeling was liked at times; raw carrot sometimes showed round holes where eaten; tomato, water-cress, parsley, and cucumber were tried; curly parsley and vegetable mix (after cooking) tempted them; two were found wrapped around little squares of carrot, two were devouring parsley, one was at a bit of tomato, and one on lettuce. Their spring tonic! This was in June, 1945.

A few days later I put in part of a banana peel with a bit of the banana adhering. Their sense of smell must be highly developed, for in less than five minutes three had made their way to the peel and tasted this wartime delicacy.

During the winter months I allowed my pets to remain dormant three to four weeks at a time, occasionally moistening the soil. Then I would take them out and place them in warm water which seemed to revive and refresh them; a meal of crisp lettuce appeases their hunger, and in a day or so, they hibernate again. I noted they were sealed in the shell by several layers of the epiphragm with a tiny hole on the left for air.

Two years ago (1943) during the spring house-cleaning, I felt the urge to clean the dwelling of the Anguispiras too. The soil, though appearing damp and glossy had become hardened. When I ran a knife around the inside edge I found it to be very hard so I turned it out on the table. The soil cracked, one end coming free and falling on the paper, thereby revealing a pocket that contained about sixty white calcareous-shelled eggs. I took the free lump of earth with eggs *in situ* to our next local conchological meeting. None of the members had had this interesting experience.

Next it occurred to me to examine the soil carefully for possible tiny snails that might have hatched, and I discovered five such. These were placed in a shallow saucer with water and a lump of dirt at one side with a piece of lettuce leaf.. After watching for days I couldn't be positive whether they were alive or not though they seemed to change position somewhat which might have been due to vibration in the room. They are now in my cabinet with a written outline of my accidental experiment.

The next year, 1944, I changed the soil very carefully, finding only one whole egg, the broken shells of others lying around. Did the Anguispiras turn carnivorous and devour their own eggs, or were the two tiny half-inch worms I found peering out of the soil one morning the real culprits?

Just once in a while do I find a snail partially buried in the soil. Being nocturnal in their habits I can not follow all their activities; but it has been an interesting experiment to me.

THE MUSEUM OF COMPARATIVE ZOOLOGY— BURRY MARINE MUSEUM EXPEDITION OF 1944

BY RICHARD W. FOSTER

During the months of July and August, 1944, Mr. and Mrs. L. A. Burry of Pompano, Florida, carried on dredging operations off the Lower Florida Keys under the joint auspices of the Museum of Comparative Zoölogy and the Burry Marine Museum. I was fortunate in being able to accompany them during a part of their trip.

Hauls were made at forty stations. These embraced an area extending from Carysfort Light to Molasses Reef off Key Largo and from Sombrero Light to Looe Key off Bahia Honda. The depths ranged from 21 to 117 fathoms. After many hours of tedious sorting, the mollusk material netted more than 4500 lots and represented, at a rough guess, about three hundred and fifty species.

Some of the more outstanding species included among the relatively few lots which have thus far been worked up are: *Modiolus politus sagittatus* Dall, *Pecten tereinus* Dall, *Haliotis pourtalesii* Dall, *Diadora aguayoi* Perez Farfante, *D. fluviana* Dall, *D. sayi* Dall, *Cassis madagascariensis spinella* Clench (92-100 fathoms), *Casmaria atlantica* Clench and Abbott (the only record for the Florida region), *Phalium cicatricosum* Meuschen, *Murex cabritii* Bernardi, *M. tryoni* Hidalgo, *Conus sozoni* Bartsch, *C. stimpsoni* Dall, *Ancistrosyrinx radiata* Dall and *Daphnella corbicula* Dall.

The following families were especially conspicuous both for their number of species and abundance of specimens: Pectinidae, Cardiidae, Aloididae, Dentaliidae, Trochidae, Pyramidellidae, Nassidae, Marginellidae, and Turridae.

This collection will form a valuable source of material for our studies on Western Atlantic mollusks and many of the records from the expedition will be found scattered throughout the pages of future numbers of *Johnsonia.*

HUNTING STROPHOCHEILUS OBLONGUS IN JAMAICA

BY PAUL D. FORD

During the many years of our missionary work in Jamaica we had many interesting experiences in collecting shells. Among them was our hunt for *Strophocheilus oblongus* Mull. We knew they lived somewhere on the island, for we had on various occasions came across their broken bleached shells. But try as hard as we could, we were not able to find any living specimens. The situation took on a desperate aspect, after having been five years on the island.

We had questioned many natives on the whereabouts of such shells, but without success, until one day we questioned a native who was working near our district. We showed him a dead specimen and offered him money if he would bring us some live ones. The next day, to our surprise, he brought us eighteen living specimens. We paid him for the shells, but he would not tell us where he got them, but knowing the general direction in which he went to hunt them, we set out with a determination that we would not give up till we found them. I took my sons Veril and Reuel with me. After locating an area where there were dead specimens on the ground, and searching it in every conceivable manner, at last we found one alive. It was two-thirds concealed under the loose earth. Only the apex and upper whorls of the shell were visible. But this was just enough to give us the clue of how they lived. We had always searched for them in the trees and bushes or among the weeds and grass and under rocks and logs, but not under the ground. Their manner of concealing themselves is under the loose earth in protected places, such as close to protruding rocks or near the roots of trees, and close to cactus plants, where they would be least likely to be trodden upon by man or beast.

After our discovery of this first one, we turned and went back over the same ground that we had just hunted, and looked for their protruding tips, and even for little mounds of dirt, with no part of the shell visible at all, and in this manner we found that we had by-passed dozens of these valuable shells. The hunt became exciting. The shells were large in size and perfect specimens.

Then came the climax of the hunt. As Veril was holding one of them, waiting for the snail to retract into its shell, it laid a large white egg in his hand. I had read about these snails laying eggs with a calcareous shell, and now we knew it to be so. We had seen them listed in a shell price list at one dollar each, which was more than the price of the matured shell.

At once the thought came to us; if this one was laying eggs, perhaps the others were too, so we turned and went back over the same ground again for the third time, returning to each of the spots where we had dug out a snail, examining the holes and carefully digging deeper with our fingers; sure enough we found eggs in about two-thirds of all the holes. No hole contained more than two eggs, some holes only one. Most of the eggs were one inch in length. It is really surprising how a snail of this size can lay so large an egg, and in many cases two eggs at a laying. We found them from one to two inches under the surface of the ground. We counted our eggs, and had over fifty.

Upon reaching home, we carefully placed the eggs in a box, considering their great value, and what we could some day get for them. We boiled the snails and removed them from the shells, cleaning some and preparing to send them to our collector friends in America.

When we were ready to pack the first box of shells to send we went—about two weeks later to our box of eggs, and upon opening it, one can imagine our feelings of surprise, chagrin, disappointment, interest, enlightment, and humor all combined in one moment. Instead of a box of fifty valuable eggs, the box was alive with fifty crawling worthless little snails. Nearly all had hatched and the broken shells were strewn in the bottom of the box. This necessitated another trip to the hunting ground. This trip netted nearly as many eggs as on the first day. But upon arriving home, I immediately washed them all in clean water, pricked a hole in each end, and blew them out, as one would a fresh bird's egg.

The Strophocheilus is nocturnal in habit, crawling around at night, feeding on the green vegetation on the ground, but with the approach of daylight they burrow into the ground for concealment from enemies as well as from the direct rays of the hot tropical sun. Most of their burrows were in shady places. They live on land that is usually dry and well drained, never in swamps or near wet places.

During the seasons of drought they hide away in a dormant state, and do not move from the one position. As soon as the rainy seasons start, they become active. Matured shells are 3½" in length.

WHERE YOUR DUPLICATES WILL HELP

Many of our members are engaged in interesting work of various kinds apart from the simple "pursuit of happiness" derived from devotion to the hobby of shell ocllecting or the common love of shells which has brought us all into fellowship in the American Malacological Union. Among these is Adlai B. Wheel of Syracuse, New York, teacher of nature appreciation to the Boys' Clubs and the Syracuse Y. M. C. A. and chaplain of the juvenile Detention Home of Syracuse.

Mr. Wheel is tireless in his efforts to lead the four thousand and more boys with whom he is working into an appreciation of nature and of nature's God, employing various novel methods to arouse and sustain their interest. A year ago he spoke on his work before the Conchological Section of the Buffalo Society of Natural Sciences and demonstrated his use of shells as awards for meritorious effort.

The boys mount the shells in cardboard trays which are nothing more nor less than large flat boxes such as are used for shirts and underwear and may be obtained from department stores. Both the box and cover are used, specimens being mounted by gluing to the bottom of the tray, and the label fastened below. Some of these displays are very attractive, and the boys vie with one another in arranging their treasures neatly and artistically.

Of course it takes a lot of shells to supply prizes for four thousand eager boys, and Mr. Wheel sometimes wonders where they are to come from; but his faith never fails, and somehow or other, shells do come. But often there just aren't enough to enable him to do all that we wishes he could do. Mr. Joseph S. Gaylord sent some shells to us for him, and we have promise of others, but we feel sure that if many of our members who have duplicates which they don't know what to do with, could realize how much, they would mean to Mr. Wheel and his boys they would welcome the opportunity of sending them where they would be so much appreciated. Imperfect and beachworn specimens will be gratefully received, but Mrs. Wheel, who types the labels for all the specimens, will be glad to find any unusual species labeled, and it always helps to know where the shells were gathered. The address is Adlai B. Wheel, West Seneca Turnpike, Syracuse 2, New York.

SOMETHING ABOUT PEARLS

The following letter is given as an example of the sort of misinformation some of our boys are picking up in their travels around the world in the service of their country.

Buffalo Museum of Science June 14, 1945
Dear Sirs:

We are confronted with a problem to determine the value of certain pearls in our possession. We would greatly appreciate any information whatsoever on the subject.

The size of the pearls varies, the largest being equivalent to one buckshot. Mindanao is our area. The shell is large and called mother pearl. From the flesh they were obtained and living as far as we can determine. Lime juice was the method used. In it these pearls rotate in different directions.

The information gathered thus far is amazing. To keep these pearls alive, they are to be placed in a small glass vial, fed only once the milk of a woman's breast, a tiny drop is all that is necessary, enough to dampen the pearl. The vial is then sealed, no air penetrating inside. A period of four to five years is necessary to have a pearl of any suitable size for a ring or whatever the case may be. In some instances, if a living pearl is male (female?) in a period of two years it may shed another pearl. Two pearls must be used. If, by chance, they are of opposite sex, in due time the mother pearl should shed.

That is all we know. To us it's unbelievable, remarkable, and extraordinary. Whatever information we can get will be greatly appreciated by us. All of us will wait patiently until the day it arrives.

Yours sincerely

....

Our answer, explaining how pearls really are formed, has been acknowledged recently with appreciation.

The following clipping from a Maine paper is supplied by Mrs. S. A. Strong, Somerville, Mass.:

WATERVILLE.—The Lermond shell collection, regarded as one of the finest in the world, has been acquired by Colby College and will ultimately be put on public display in the biology building on Mayflower Hill.

Established by the late Norman W. Lermond, noted Maine naturalist, the collection has been housed in the Knox Arboretum at Thomaston. Although the number of shells is not known, the specimens fill nearly 100 cases and the collection has been evaluated by Paul Bartsch of the Smithsonian Institution at $50,000.

One hitherto unknown variety discovered by Mr. Lermond in Florida was named *Caecum lermondi* by the Smithsonian Institution in his honor.

Mr. Lermond who died last year at the age of 83, was born in Knox county but grew up in Boston, attending English high school where he excelled in botany and other natural sciences. After a career which included railroad work, colonization, and public offices, he retired to devote his full time to nature study. Returning to Maine, he established the Knox Academy of Arts and Sciences and donated his house and land to this society to be known as the Knox Arboretum, comprising 60 acres at the junction of the Oyster and Georges rivers. Here he placed his collection of Maine birds, butterflies, beetles, plants, rocks and minerals, as well as the remarkable shell collection.

The trustees of the Knox Academy, wishing to place the shell collection where it would be suitably exhibited and made easily accessible to scholars as well as to the general public, made possible the purchase by Colby College. Prof. Webster Chester, head of the Colby Biology Department, has been engaged in preparing the specimens for shipment to Waterville.

THE AMERICAN MALACOLOGICAL UNION

It was as a result of the efforts of the late Norman W. Lermond of Thomaston, Maine, that the American Malacological Union was organized in April, 1931. The organization meeting was held in the Philadelphia Academy of Natural Sciences, and Dr. Henry A. Pilsbry, Curator of Mollusks of the Academy, was its first president.

The object of the Union is stated in the constitution to be "the promotion of the science of malacology by holding meetings for reading and discussion of papers and for furthering the interests of students and collectors of shells by facilitating acquaintance and cooperation among the members."

Active membership is restricted to residents of the Americas and Hawaii, but a corresponding membership is open for residents of foreign countries, these having no vote and being ineligible to hold office. Dues for both classes of membership are one dollar a year, and members in arrears for two years are automatically dropped. All members receive current publications of the Union and notices of activities. *The Nautilus* (Philadelphia) is the official organ of the Union.

Including the organization meeting, eleven annual meetings have been held, the last in Rockland, Maine, in August, 1941. The war caused a temporary suspension of these delightful occasions, but it is planned to resume them next year now that the war is over on both fronts, and normal transportation conditions are being restored. We have received an invitation from Dr. Paul Bartsch to hold the first meeting in Washington.

Reports of the first three meetings, 1931 to 1933, were published in *The Nautilus* only, but the Union has issued a more detailed report with revised membership list for each meeting since, from 1934 to 1941, with a News Bulletin for 1942-43 which was published early in 1944. The present issue of the News Bulletin thus makes the tenth report to be published by the Union.

In tribute to its first president the Union issued, in 1940, an important bibliography of the published works of Dr. Henry A. Pilsbry. This publication, "Scientific Contributions from 1882 to 1939 by Dr. Henry A. Pilsbry" is sent to all new members in addition to current literature.

The publication of the Dall Bibliography, plans for which were announced last year, is in progress. Col. Charles Whitney Dall generously contributed $250 to the Union which furnished an equal amount, the balance of the expense of publication to be donated by the Smithsonian Institution which is publishing the book and will distribute it to all members in due time. Dr. Paul Bartsch has written the biography of Dr. Dall which accompanies the bibliography of over 1500 titles.

It is gratifying to be able to report that notwithstanding the enforced curtailment of group activities during the war, individuals here and there have been busy with various problems and research, and many boys in the service have had their interest aroused by the discovery, on foreign shores, of curious and beautiful shells. So it has come about that the natural desire for association in something new and rare, turns some of them to the American Malacological Union. Thirty-seven new members have been gained during the past year.

It is sad to report that four members have been lost by death, our corresponding secretary and organizer, Norman W. Lermond; John H. Clarke, Arthur F. Gray, and Irwin W. Spalding. Only two members have resigned.

It is with deep regret that the Executive Council of the Union has accepted the resignation of Dr. Louise M. Perry from the office of president which she has held since the death of Frank Collins Baker in May, 1942. Dr. Perry has served, notwithstanding illness and an unusual burden of work imposed by the benevolent Eye Clinic instituted as a part of her contribution to the war effort, but now feels that she must be relieved of all extra responsibility.

Dr. Henry van der Schalie of the Museum of Zoölogy of the University of Michigan, who was elected vice-president in 1944, becomes president, succeeding Dr. Perry. The vote of the Council confirming Dr. van der Schalie in the office until the next meeting of the Union is unanimous, and all extend congratulations and best wishes to our new president.

The offices of vice-president and of corresponding secretary will remain vacant until another meeting and election can be held.

The Council at present consists of the following members:

Henry van der Schalie, President.
Mrs. Harold R. Robertson, Financial Secretary.

Councillors at large:

Joseph C. Bequaert, Myra Keen, John Oughton, Harry E. Wheeler.

Past Presidents remaining on the Council without reelection:

Joshua L. Baily, Jr., Horace Burrington Baker, Paul Bartsch, William J. Clench, Calvin Goodrich, Louise M. Perry, Henry A. Pilsbry, Harald A. Rehder, Maxwell Smith, Carlos de la Torre.

Several members have sent in their dues for the current year without waiting for the formality of receiving a bill. Our sincere thanks to all these. Unless one has gone through the labor of making out bills and addressing 275 envelopes when other duties press, it is impossible to know just how much this means to your financial secretary.

And because this little Bulletin will go to all members, she is taking advantage of the opportunity to ask that you please look at your membership card and note expiration date. If it is June 1, 1945 or before, please send a dollar for each year due, to Mrs. Harold R. Robertson, 136 Buffum Street, Buffalo 10, New York, to pay up to June 1, 1946. Thank you.

The Committee on Nomenclature:

Henry A. Pilsbry, Chairman
Paul Bartsch
William J. Clench
Horace B. Baker
S. Stillman Berry
Harald A. Rehder

FROM OUR MEMBERS

DR. B. R. BALES, writing from Marathon, Florida on April 3, 1945: We have had a very successful collecting season and are now ready to start the long trek home. . . . Tom McGinty spent three days with us last week He and Dr. Pilsbry are working on the Cyclostrematidae, and the article (or articles) will come out in *The Nautilus* soon. Tom is making all the drawings. These shells are very small and Tom's drawings will be figures magnified 25 diameters. . . . The mollusks live on the under side of huge rocks, and it takes a lot of hard work to collect them, but Tom found about a dozen in several different varieties.

We were fortunate in having a peevey, a sort of tool used by lumbermen, and when a good strong fellow like Tom took hold of it, something just had to come. My friend, W. P. Cook of California, sent me the peevey a couple of years ago and it is one grand tool to use when turning these huge rocks. Tom says that they will name one of these shells for yours truly. It will be *Cyclostrema balesi,* and I am duly thrilled. With the exception of three specimens of *Cancellaria adeleae* Pilsbry, and it's a rare one, most of the best material I have taken has been taken the hard way, by screening. We were fortunate in having a grand place to screen, just back of our cottage, not the distance of a city block, and I took full advantage of it.

CAPT. ELMER G. BERRY, Florida State Board of Health, Jacksonville, Fla.: My work has been changed to Investigations of Schistosomiasis, and I am to spend full time on the snails and particularly the family Amnicolidae!

I truly have been a "traveling snailsman", criscrossing Florida, Alabama, Mississippi, Louisiana, southern Texas, and finally back into New Orleans. Tomorrow I start out again, this time for northern Texas, and will head for New Mexico and Utah.

I have lots of interesting material which will keep me busy for several years. I'm glad to have found so many of the species which have been described, but of which nothing was known of the soft parts.

WILLIAM J. CLENCH writes from Holguin, Cuba, July 25, 1945: We arrived here yesterday. . . . I am with Dr. Aguayo. We plan to collect a twenty-five mile radius during the next two weeks, then start back toward Habana, a week here, a week there, at several places in Cameguey and Santa Clara.

Had our first collecting today at Santa Anna, the type locality for *Liguus fasciatus achatinus* Clench, a species described over ten years ago! Tomorrow we go to a new area some twenty miles southeast of here, Wednesday to Gibara in quest of Cerions and Johnsonia marine records. This is the first collecting I have done since our field day at Rockland, Maine!

RALPH W. DEXTER, Kent, Ohio: In addition to items published in *The Nautilus* I have had the following published during the current year: The Bottom Community of Ipswich Bay, Massachusetts. Ecology 25 (3): 352-359, July 1944. Ecological Significance of the Disappearance of Eel grass at Cape Ann, Massachusetts. Journal of Wildlife Management. Vol. 8(3): 173-176. July 1944. These two articles contain information relative to marine mollusks among other things. Also, I have completed field collections for a study which I have entitled "The Mollusks of a Basic Bog Lake and Its Margins" which I hope to bring out within the coming year.

WALTER J. EYERDAM, Seattle, Washington: Since September 10, 1941 I have been working on swing shifts as chipper and caulker in one of the naval ship yards in Seattle, so very little time has been afforded for general out-of-door collecting trips. However, last August I spent a delightful week in the Olympic Mountains collecting plants and the few land and freshwater shells that I could find. These were *Monadenia fidelis* Gray and several species of *Pisidium, Planorbis, Lymnaea,* and *Physa.*

During spare time at home I have contributed monthly to the report on the marine shells of the Northwest Coast of America from shells that I have collected. This report is edited by John Q. Burch in the Minutes of the Conchological Club of Southern California. It is an important contribution to the knowledge of the west coast shells.

I have also carried on a considerable correspondence with shell collectors and have added over 1,000 more species of shells and many important books on shells to my collection.

RALPH O. FOX, Berkeley, California: I managed to get a little collecting this month at Santa Cruz. Found a large area west of the City Pier which at low tide is covered with *Olivella biplicata* Sowerby. I found it hard to stop collecting for I had a large sack, and each handful had many unusual colorings.

CALVIN GOODRICH, Hendersonville, N. C.: We came down here to look around. This region is a poor one for mollusca. No clams, only one pleurocerid and that rare, no *Planorbis* or *Lymnaea* so far as I can see, no *Amnicola.* Land shells are scarce and mostly confined to a zone in the mountains where the clouds condense. To illustrate rarity: Some weeks ago I found a colony of *Polygyra* at a place on the ridge a fire of last spring had not swept through. They were adolescent, and I left them for future picking. I went back last week in hopes of taking them in as adults. Not one was to be seen, and only one "bone." Doubtless they'd scattered to places I could not trace.

I hope soon to get over to the Smokies where limestone occurs and encourages existence.

As a summer hobby I have been collecting and transplanting ferns. Eighteen species are listed for the county, to which two of recent findings can be added. I have thirteen of them and have seen another in an inaccessible place under falls. One that goes quite around the world is credited to the country. I have seen not a sign of it.

DR. FRITZ HAAS, Chicago Museum of Natural History: While a critical revision of the Chicago Natural History Museum's old collection was continued and, practiaclly, almost finished, the study of new accessions was mainly confined to shells turned in by members of the U. S. armed forces overseas. The material thus received often consisted of worthless beachworn specimens, but some collections were really excellent, both as to the conservation of the shells and to the information going along with them. Many collectors, too, brought us collections made in some point or another of the vast battlefield in the Pacific just to have them classified or in order to receive information about them. Other museums' malacologists will, no doubt, have the same experiences I had: to disappoint some enthusiastic collector who claims to have picked up or received a specimen of *Conus gloria-maris!*

Among the shell material acquired by purchase in 1944, that received from the Frank Lyman family in Lantana, Florida, is well worthy to be especially mentioned; not only on account of its wonderful preservation, but also for the important ecological information as to station, depth, etc. which is accompanying it.

The library of the Chicago Natural History Museum's Division of Lower Invertebrates has been greatly increased this year, but it's still far from complete and I wonder if other museums and institutions or private collectors would be willing to offer me their duplicates of malacological literatures, serials, books, or reprints. I would be glad to acquire them, if need, either by exchange or by purchase.

Dr. Myra Keen, Stanford University, California: Aside from my wartime teaching duties, I have been busy identifying and cataloging the numerous shells that Dr. Schenck and our graduate students overseas are sending back. Shipments from New Guinea, the Marshalls, the Marianas, and the Philippines have contained a number of species new to the Stanford collection and some that seem to be new to science.

Lieutenant Colonel Hubert G. Schenck was recently awarded the Bronze Star medal for meritorious achievement in the Pacific in connection with military operations against the enemy. He is with the Army Engineers, stationed in Manila.

Charles Bruce Lee, Buffalo, N. Y., writes from Tuskegee: Every Saturday has been spent in the second growth forests that are the heritage of waste in this part of the U. S. A. I have literally torn apart hillsides looking for the elusive mollusks. So far I have unearthed ten species. The find of the season was two specimens of *Polygyra albolabris fuscolabris* which I sent to Dr. Pilsbry to check my identification. He kept the bodies and returned the shells. He returned three new shells, a Ventridens of which he wishes additional specimens. I have collected in vain but can find no new specimens. I shall return them to him and he can name them. I suppose I am being optimistic to hope to have them named *Ventridens leensi.* So far I have added about four new species to the fauna of Macon County.

Dr. John Oughton, writing from Yellowknife, N. W. T.: I am here on Great Slave Lake again engaged in research for the department of Fisheries. Our barge, combined living quarters and lab, is located about sixty miles to the south. We shall stay here just long enough to check up on the seasonal changes from the stations we sampled a year ago.

Yellowknife is in the midst of a mining boom. It is reminiscent of the boom days in the Yukon, Alaska, and California. There is the same chaos if wild, childish, lovable people.

Dr. Louise M. Perry, Asheville, N. C.: My Eye Clinic will reopen the latter part of August. I am going to have a little more help and look forward to a busy winter in Clinic work and efforts to further plans for a sight saving class in the City schools. Clinics out in the mountains are badly needed and one of these days I'm going to write a treatise, no less, on the evils of the Country Church. They are real and hardly compensated for by the moral influence of going to meeting.

Have I told you that my Sanibel home was badly damaged by the hurricane of last October? I went down and was discouraged, after this fourth experience, to the degree that the place was sold at once with finis written to that chapter.

Myrle A. Sprague, Y2c, WAVES Barracks, Pier 91, Seattle Washington: To date I have had no interesting experiences along the collecting line; in fact, I have been greatly disappointed. Mr. and Mrs. Oldroyd gave me so many fine shells from this locality my hopes were very high when I first came here. It wasn't long, however, before I discovered that the so-called beaches primarily offer dead shells, generally badly worn and broken. One or two species of clams can be found by digging and small mussels cling to the rocks at low tide.

Within the next month or two I hope to fulfill a long-time ambition by visiting Friday Harbor, San Juan Island.

Dr. Henry van der Schalie, Ann Arbor, Michigan: Beginning last July when Mr. Goodrich retired, Dr. Katherine Merry and I have been doing our best to carry the routine here. I miss Mr. Goodrich here and find that correspondence and routine curatorial work leaves all too little time for some of the creative jobs we enjoy doing. Mr. Goodrich was a hard and steady worker, so that his leaving will cut into the constructive and productive capacity of this division. During his active curatorial career our divison made tremendous progress. We grew from a unit with about 45,000 lots accessed to one that now has nearly 165,000. There are many other indications of his constructive endeavors which cannot be mentioned for lack of space and time. However, if this division can grow in proportion in the future we shall have every reason to be satisfied with our progress.

One of the highlights of the past year was a visit by Dr. A. B. Leonard of the University of Kansas. He and his associates have been active in building an unusually fine mollusk collection in the Dyche Museum at Lawrence. It is certainly encouraging to find this fine organization with a vigorous group of workers. They are doing a high grade of work and I hope all who can cooperate with them will help in promoting the work in that center. Now that the museum activities at the University of Illinois have somewhat disappeared with the passing of the late F. C. Baker, I hope this new activity at Kansas will compensate in some measure for the loss sustained in Illinois. It is unfortunate that we have not had our regular A. M. U. meetings because I am sure this group would enjoy getting acquainted with Dr. Leonard and Miss Dorothea Franzen who works with him.

Dr. Merry and I have been making short trips into the field to collect *Valvata* and she has succeeded in getting some interesting observations with that group.

Dr. Roman Kenk has been with us this year working on the material he gathered when he and I exchanged services. The University of Puerto Rico granted him a sabbatical leave so he now can complete his studies of local woods pools which he carried on during the 1940-41 school year.

Aurele LaRocque is now working here with us and I feel that with his help and some opportunities to function as we ordinarily would in normal times, we could make arrangements for an enjoyable A. M. U. meeting here.

Major Merrill Moore, Boston, Mass., has been awarded the Bronze Star medal in recognition of "meritorious achievement in connection with military operations against the enemy in the Southwest Pacific."

BOOK REVIEW

THE MOLLUSCAN FAMILY PLANORBIDAE by Frank Collins Baker. Collation, Revision, and Additions by Harley Jones Van Cleave. University of Illinois Press, Urbana, Illinois. $14.50. 530 pages; 141 plates.

Reviewed by Imogene C. Robertson.

This superb volume will be welcomed by all students of fresh water mollusca. Frank Collins Baker had done an enormous amount of intensive research on this important family of mollusca during the last twenty-five years of his life, a life cut short too soon to allow of the completion of the stupendous task he had set himself, that of making a thorough study of every species of Planorbidae available.

The malacological world owes a debt of gratitude to Professor Van Cleave for giving to it so soon the results of Mr. Baker's labors in so far as they had been finished. This beautiful book is a testimonial to the friendship and understanding which existed between the two men, for the editing has been done with all the care which the author himself could have bestowed.

The book is in two parts, Part I relating to Classification and General Morphology. This describes in detail the characteristics of the genera throughout the world and lists all valid species as recognized by Mr. Baker up to the time of his death. As he says, these may have to be revised as the result of future studies, the studies which he was not permitted to complete and which were, in part, to have formed the substance of Part II, originally designed to cover all known species inhabiting North and South America and the West Indies.

As here presented, however, detailed descriptions are given only for new species and varieties. The lack of descriptions of previously named species is compensated for in part, by the magnificent plates, seventy-five of which show anatomical features delineated in drawings by the author himself, the remaining sixty-six being photographs of the shells, so beautifully done that a study of the figured species almost will answer for that of the shell itself. Fortunately, too, these photographs include all genera and most species.

The new classification arranged by Mr. Baker is so convincingly presented that it undoubtedly will be accepted as the basis for future work as the author planned. The Memorial to Frank Collins Baker by Dr. Van Cleave gives a sympathetic account of the scientific work of a sincere and indefatigable scientist and reveals a kindly and engaging personality which endeared Mr. Baker to all who were privileged to know him.

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